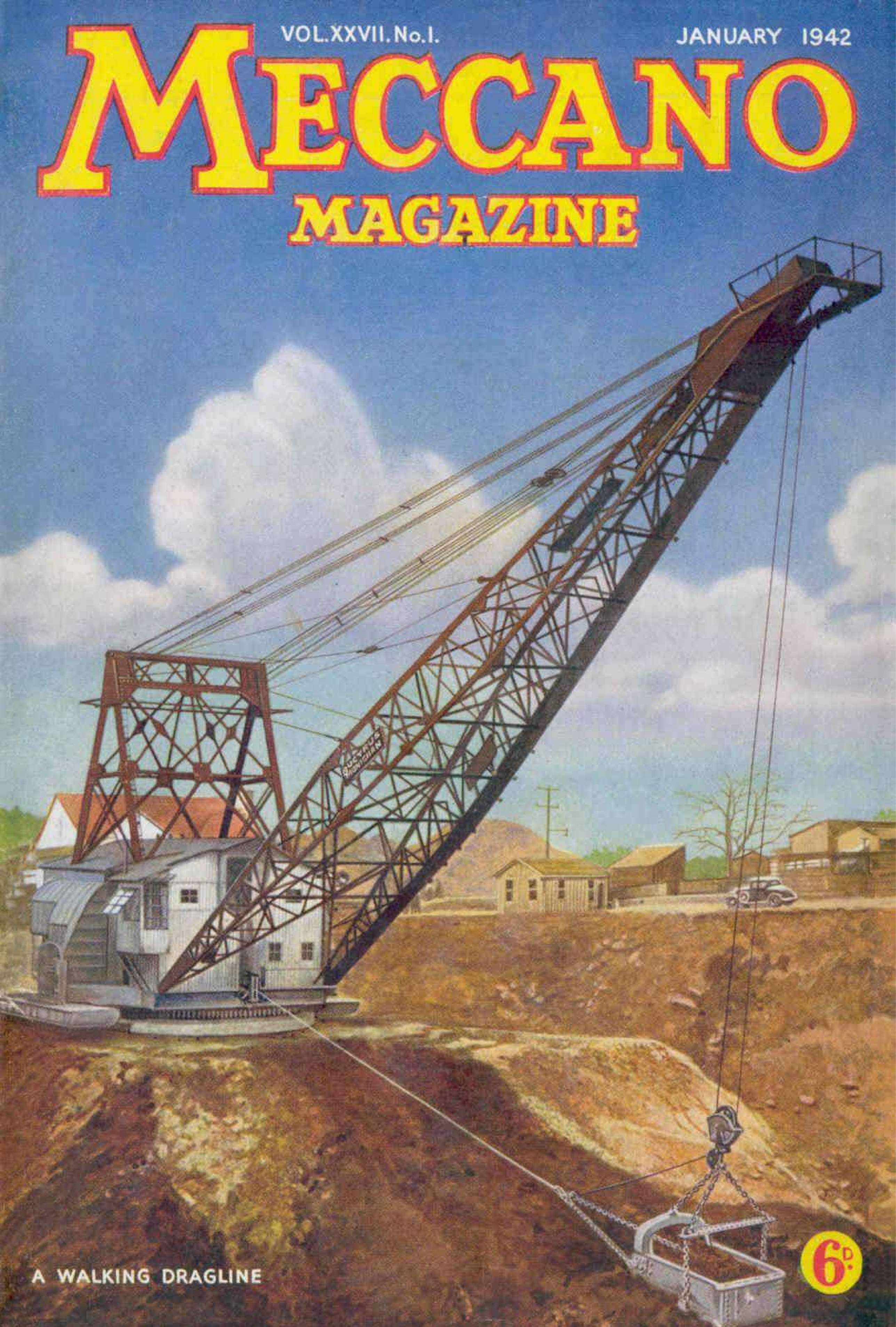
VOL. XXVII. No. I. JANUARY 1942

MECCANO MAGAZINE



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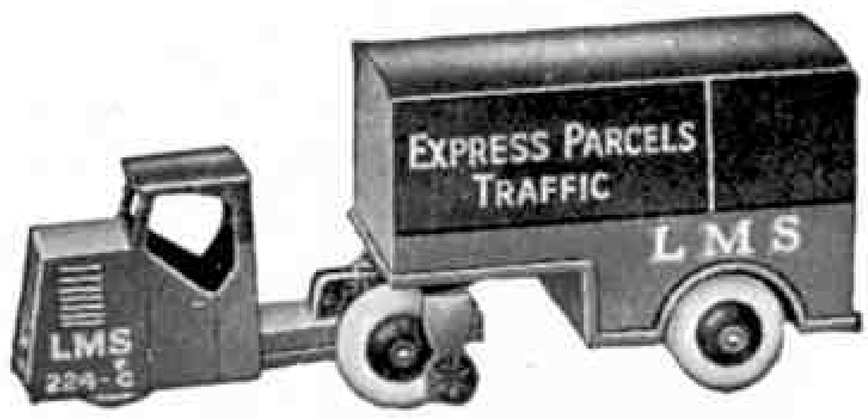

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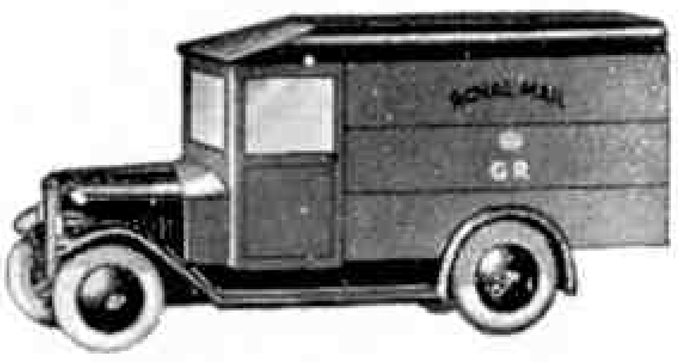

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No. 12c Telephone Call Box
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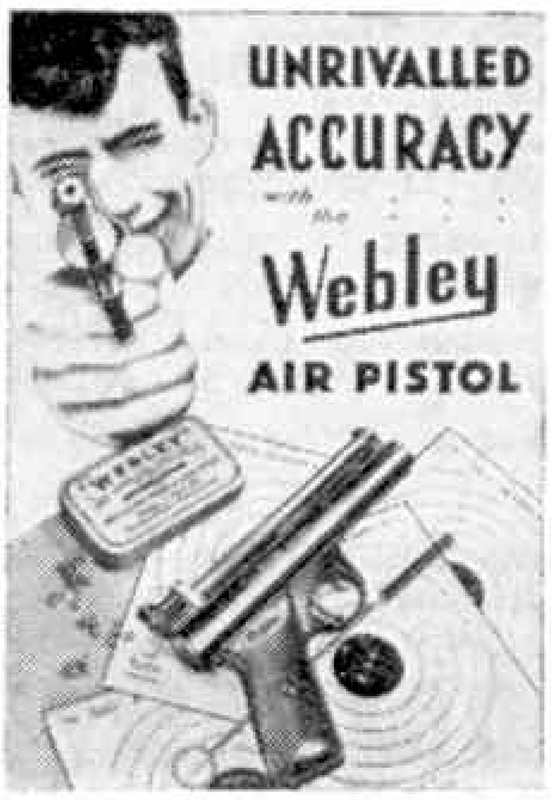

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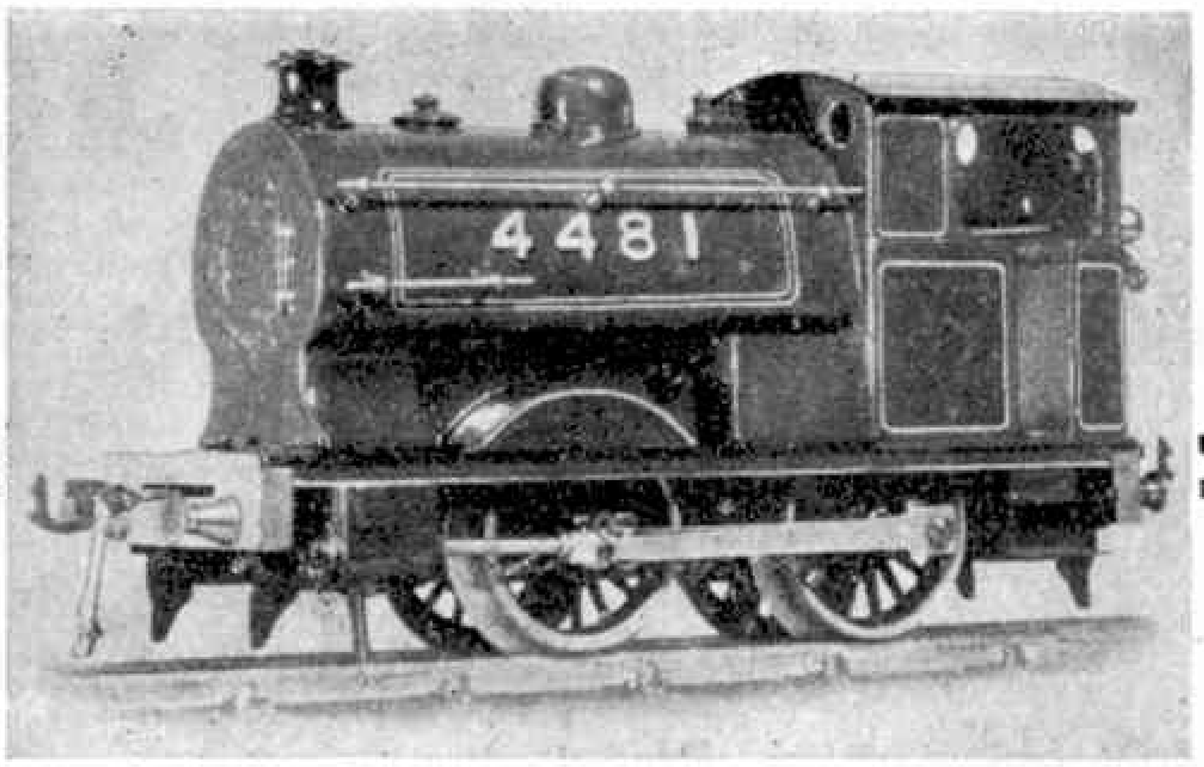

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On galleon—*and other ship*—building

Isn't it queer how as a nation we love building ships? Or is it? Most of our ancestors came here first by sea—for trade and plunder! The Phoenicians for Cornwall's tin in the very early days—the Romans (perhaps for our oysters)—the Angles and Saxons, the Vikings and the Danes, the Normans. And as the early generations came, so the later generations went. First to and fro from France, then to find the North West Passage to India (because trading through the Mediterranean was so very dangerous!). Then Drake went out to harry the Spanish Galleons bearing silver and treasure from the West. Then the Pilgrim Fathers sailing West—to find *freedom to think.* Ships are in our blood. No wonder we enjoy building them, of every sort from paper boats in the bathroom to gigantic armoured aircraft carriers complete with loads of torpedo-carrying planes!

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A HAPPY NEW YEAR TO EVERY READER—THE EDITOR

MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXVII
No. 1
January 1942

With the Editor

Our New Size

Well, readers, here is our first issue with the smaller page that I have reluctantly been compelled to adopt. I wonder how you will like it! I imagine that most of you, after surviving the first shock of the change, will feel as I do—that the result is not so bad after all, and that this plump little Magazine has certain attractive features of its own. When you have looked over your copy carefully I want you to write and tell me what you think of it. In particular I want your suggestions for improvements, especially in the sections in which you are most interested.

A Scottish reader has suggested that I should devote space to the publication of extracts from letters from readers describing the various ways in which they are helping the National war effort. He says that this would encourage those who are already doing their bit, and give practical help to those who are on the lookout for something really useful to do. I think the suggestion is a good one, and I shall welcome all letters of this kind.

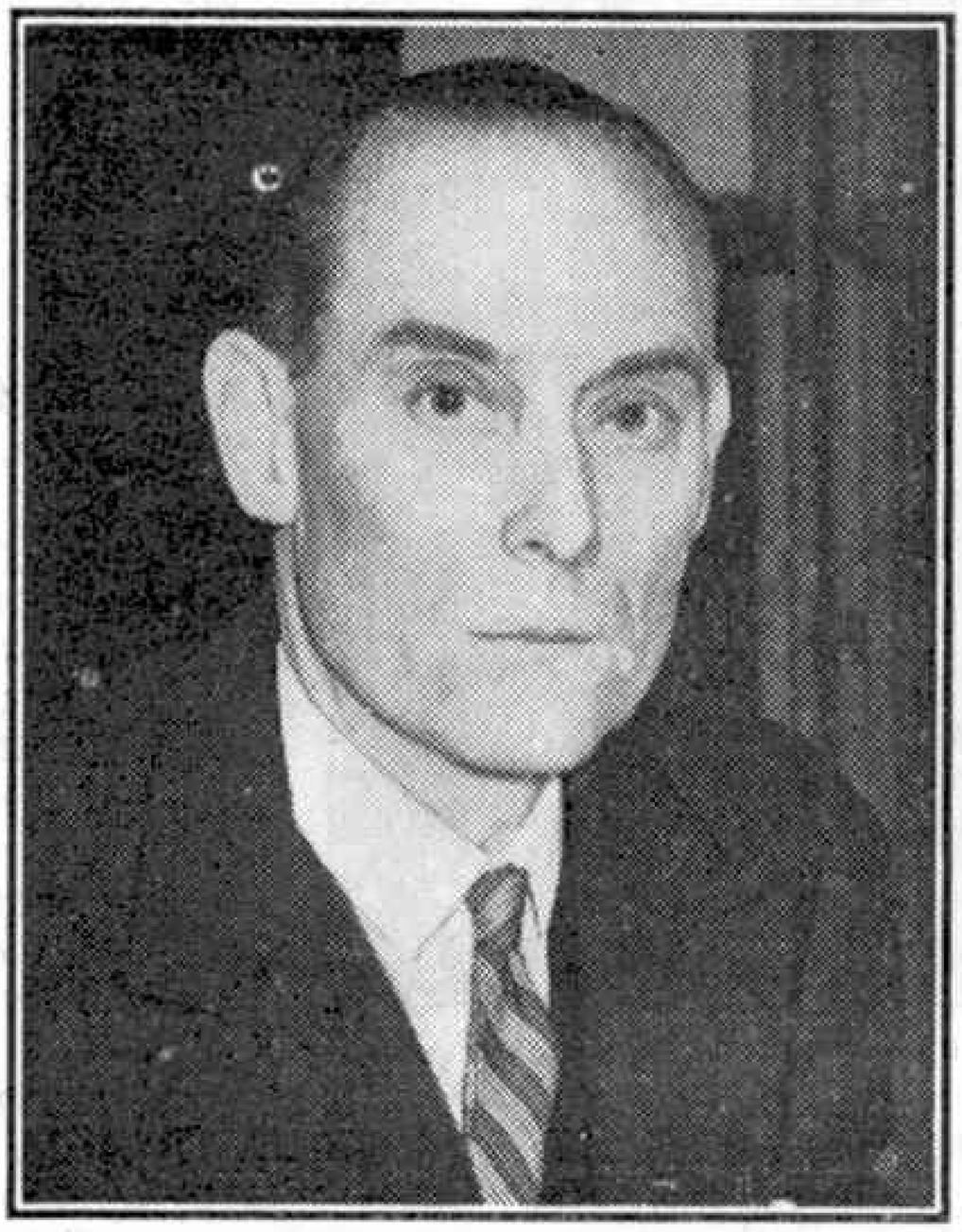
This is the favourite time for making good resolutions. Here is one for you all—

Begin the New Year well by sending a donation to the "M.M. Harmonica Fund for the R.A.F."

Leaders in the War

XXVI.—Capt. H. D. Margesson

Capt. Henry David Margesson was born in 1890 and educated at Harrow and Cambridge. He served in the 11th Hussars throughout the war of 1914–18. He became captain and adjutant, was mentioned in despatches and awarded the M.C.



Captain Henry David Margesson, M.C., M.P., Secretary of State for War.

After leaving the Army Capt. Margesson spent some time on the staff of a large store in the United States to gain business experience. On his return to England he entered Parliament as Member for the Upton Division of West Ham. His earliest Government appointment was that of Parliamentary Private Secretary to Sir C. A. Montague Barlow, Minister of Labour, 1922–3, and in 1924 he became Assistant Government Whip. In the latter year he was elected Member of Parliament for Rugby, and two years later, in the Baldwin Government, was appointed a Junior Lord of the Treasury. Subsequently he became Parliamentary Secretary to the Treasury, and Chief Whip, when the National Government was formed in 1931.

Towards the end of 1940 Capt. Margesson succeeded Mr. Anthony Eden as Secretary of State for War.

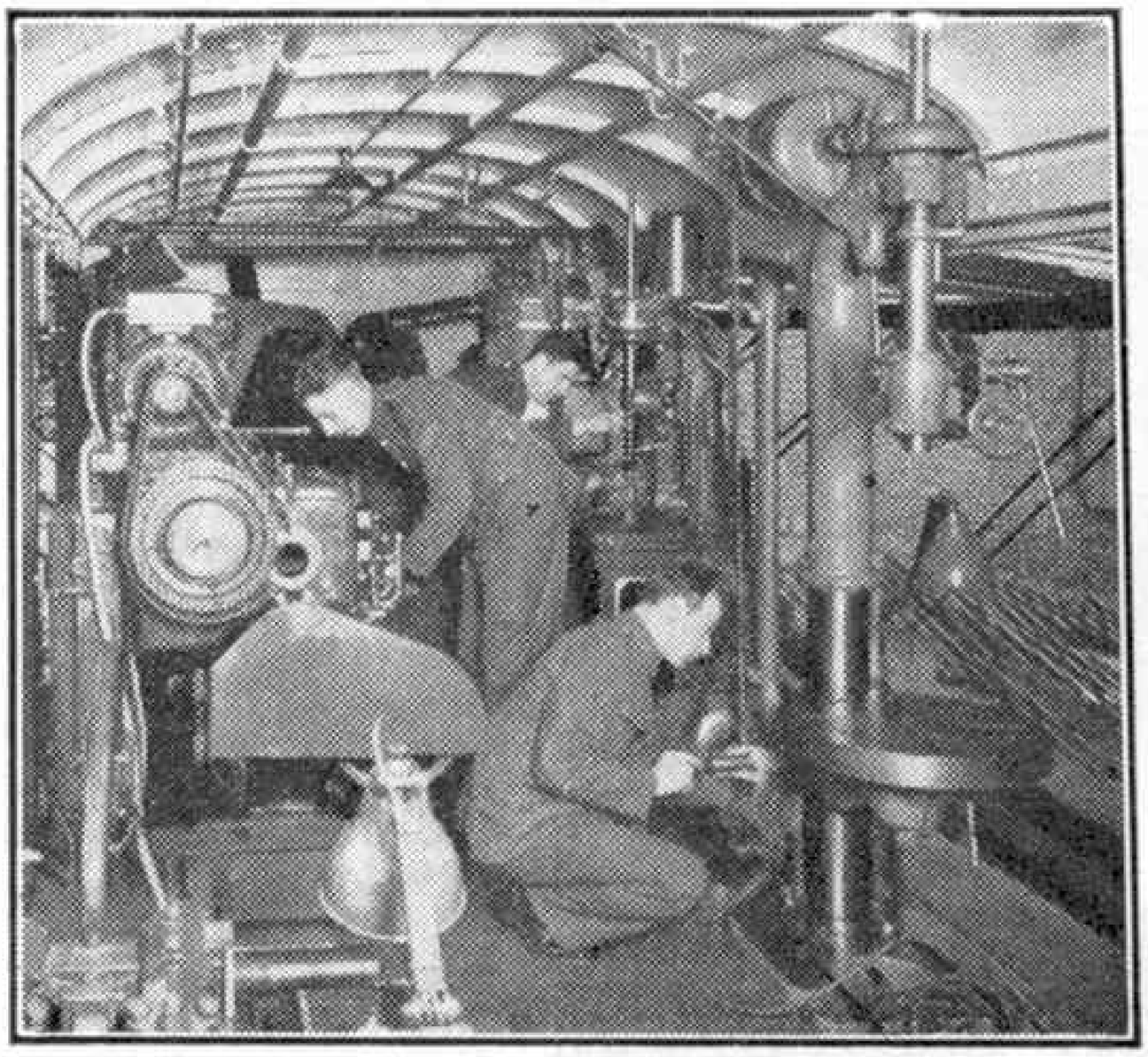
Auxiliary Vehicles of the War Machine

By Captain J. E. A. Whitman

TO the ordinary mind, steeped in the newspaper reports of great battles and movements of unparalleled scope, the mention of the vehicles of an army conjures up an almost endless vista of tanks, Bren gun carriers, troop carriers and all the rest of the fighting impedimenta of mechanised warfare. But there are many other kinds of vehicles which play an important part—although perhaps a non-combatant role—in the maintenance of an army in the field.

The tractor itself is by no means new. Steam tractors, or traction engines, were used by Sir Garnet Wolseley in the Ashantee war of 1873, where, it is related, the screams from their whistles and the escape of steam terrified the natives, being regarded as omens of the white man's terrible magic. A special demonstration of steam tractors was given before the Duke of Cambridge in 1877, when one engine drew a train comprising three 32 pdrs. on travelling carriages. In later wars its use was extended; but it was reserved for the day of petrol to make it possible for other vehicles of general utility to take the field.

It is surprising how much repair of the soldier and his weapons can be actually accomplished within a short distance of the field of battle. Even as late as the last war, casualties requiring a serious operation had to be sent down through a chain of clearing stations until a R.A.M.C. depot was reached, where skilled surgeons were available with their delicate instruments. To-day we have the Medico-Surgical mobile units, which carry a specialist staff and a full equipment to the nearest possible point to the battlefield, enabling operations of the most delicate character to be performed under fire of the enemy guns.



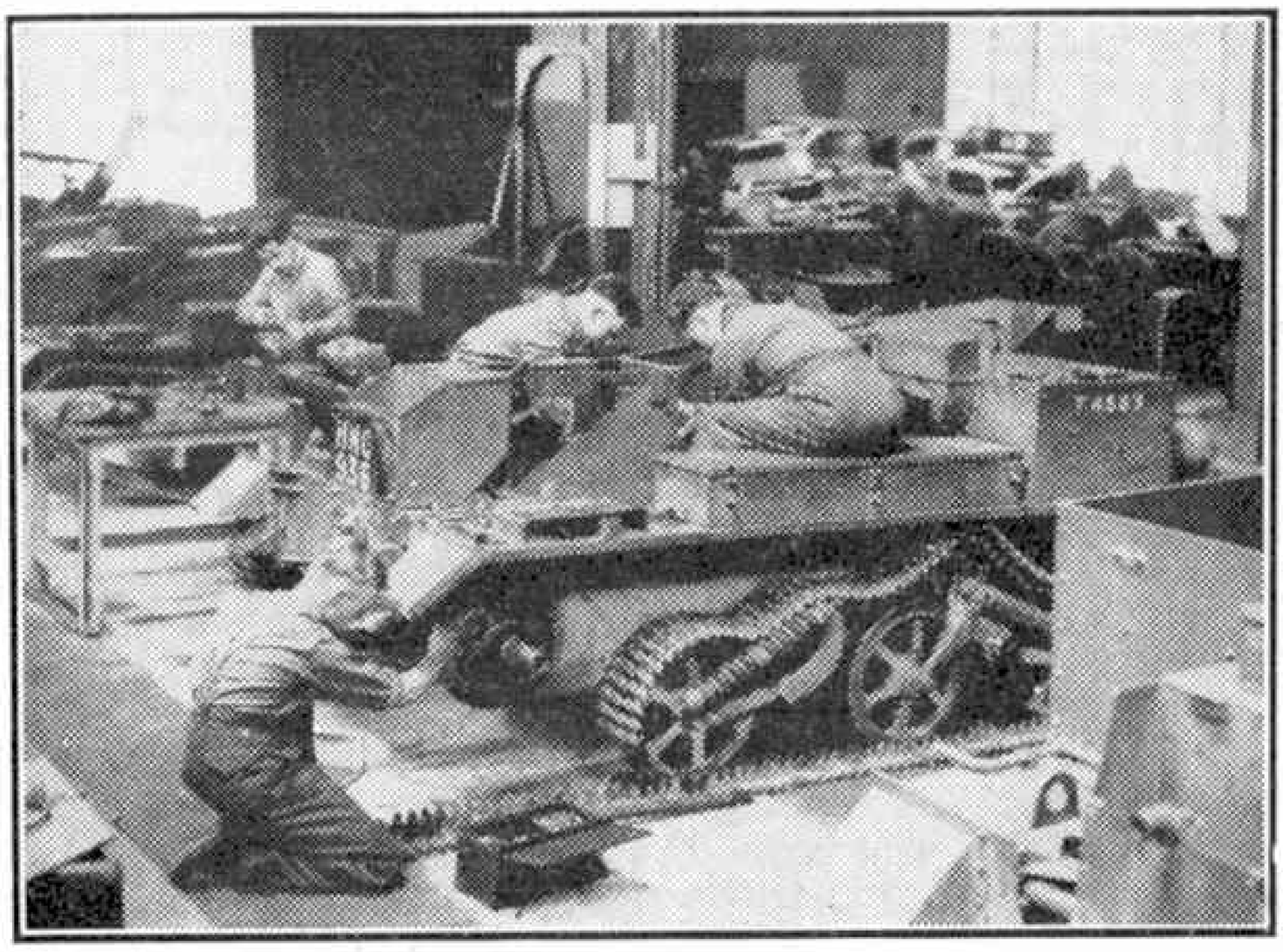
Soldiers at work in a mobile railway workshop.

Closely allied to these are the vans carrying blood in bottles for transfusion purposes. Many such are now in service, each carrying, besides its skilled staff of R.A.M.C. and V.A.D. personnel, its load of, literally, life-giving fluid available for immediate use where the need arises.

Tommy Atkins to-day can justly be said to be serviced from head to foot. He may develop toothache. In the old days he had to stick it, or maybe (in the mounted regiments) the sergeant-farrier would come to the rescue with a pair of pincers of such fearsome proportions that at the sight of them the pain probably disappeared at once! Not so to-day. A medical officer writes a few mystic words; Tommy goes down the line a little way, and finds himself in a perfectly equipped travelling dental clinic in which everything can be done from drawing a tooth to replacing a stopping, and this in a manner differing not at all from the most elaborate West End practice.

Or perhaps his feet trouble him. Frequent inspections and the meticulous care now taken of feet do not altogether meet the case. Again the M.O's chit is signed, and Mr. Atkins finds himself in a van where the ministrations of skilled chiropodists speedily remove the ingrowing nail or restore the dropped arch as the case may be.

Repair of the machine is no less important than the repair of the man; and for this purpose the Army has the service of the marvellous workshops of the Royal Engineers, the Royal Army Ordnance



Overhauling a Bren gun carrier.

Corps and the Royal Army Service Corps. It would be easier to say what work these do not accomplish than to compile a list of the work they do.

Many of us have lively recollections of the fertility of resource and adaptability shown by our old friends the Sappers. Nowadays the Sappers are more concerned with main lines, and in consequence most of their mobile workshops are found on the railways. We illustrate one of these, and, as will be seen, it is very completely equipped, with machine tools of every description. The Q.M.S. in the old story who wrote off the bicycles as being unfit for further service, the young officers having played polo on them, would now be able to have them repaired without difficulty.

The mobile workshops of the Royal Army Ordnance Corps are models of compactness and efficiency and are capable of undertaking a wide range of work. A gun in the line develops a fault, usually through intensive firing. Eagle-eyed Ordnance officers, who make regular inspections of all guns while these are actually in the line detect the fault, away goes the gun to the workshops for immediate treatment. In most cases the process is extraordinarily rapid; faults can be corrected on the spot which otherwise would necessitate the return of the gun to an arsenal. Spares of all kinds are carried, and short of actually replacing an inner tube it is surprising how extensive are the repairs that the R.A.O.C. can effect in the field.

The Royal Army Service Corps, as might be expected, has a great variety of service vehicles. It has its mobile workshops which maintain in an efficient state not only the other vehicles of the regiment, but also the troop carriers, Bren gun carriers and other units of the fighting forces. Then too it has many types of supply vehicles of which the average man knows but little. For instance, a petrol supply company will include many tankers with a capacity of hundreds, even thousands, of gallons; it will also have many lorries carrying supplies in two-gallon tins.

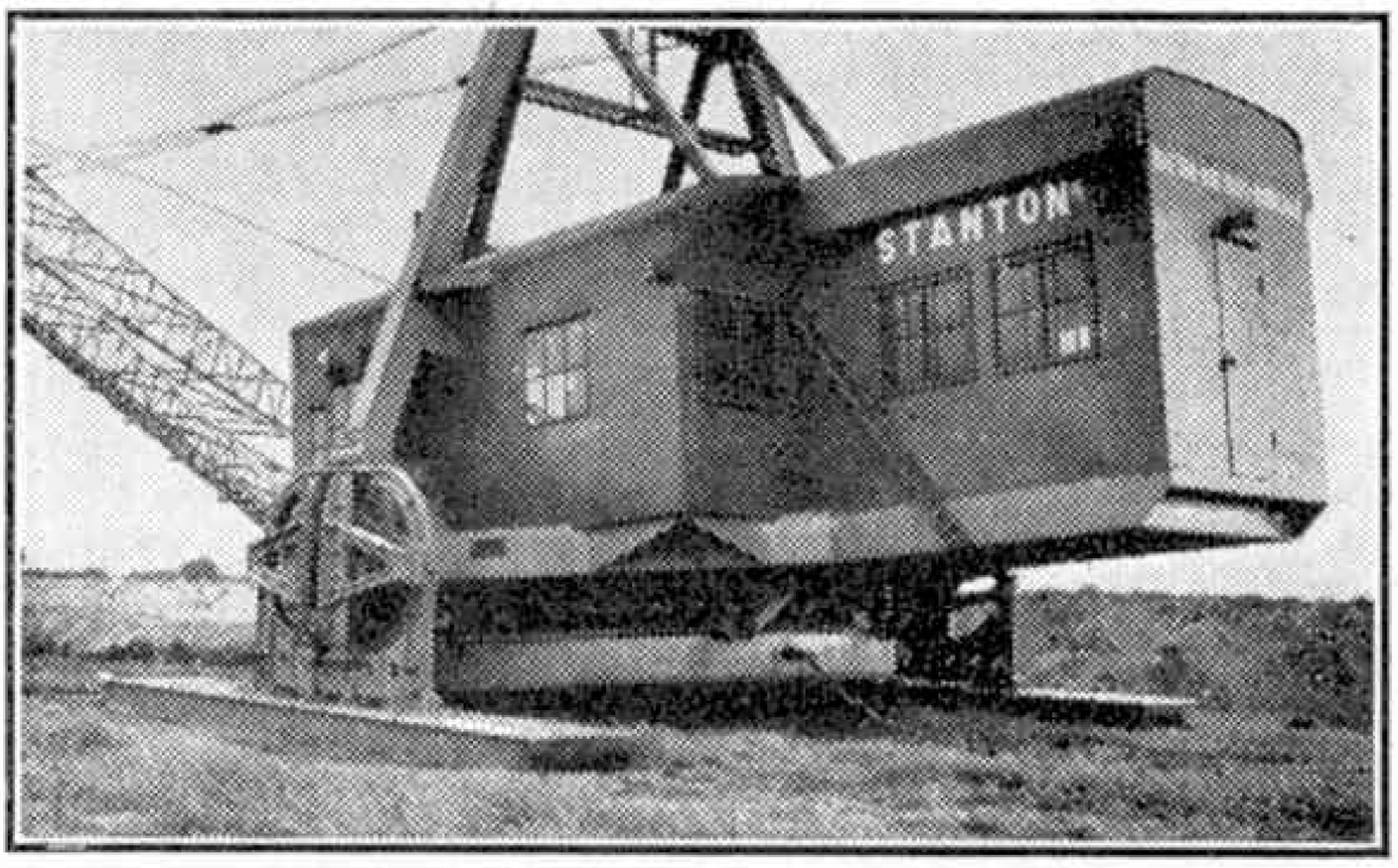
Letters from home are perhaps the greatest pleasure to the soldier in the field. Whether it be to read about the new baby or baby's new tooth or daughter's new sweetheart or wifie's new suite of furniture, it is "News from Home" and the travelling Post Office brings it. Manned by specially selected members of the G.P.O. staff, it sorts and delivers letters with a speed that vies with St. Martin's le Grand. The work of these units in the Western Desert campaign has been beyond praise.

There is, however, one vehicle that is the most popular of all. The bugle may still sound "Come to the cookhouse door, boys," but as often as not it is the cookhouse that comes to the troops, in the shape of the travelling kitchen. Long may it continue its comforting journeys!

Unloading a mail van.

The Walking Dragline Excavator

THE dragline excavator is in many respects the most interesting of all the machines developed by engineers for most excavating jobs. For many operations it has superseded its predecessor the power shovel and in others opened up entirely new uses. The main difference between the two machines lies in the method of working. The power shovel excavates above the level on which it stands; it works away from itself, and it moves forward into the excavation as the work proceeds. The dragline does the opposite. It excavates below the level on which it stands; it works towards itself, and it moves backward when it has excavated all the material within reach.



A 5-W Ruston Bucyrus-Monighan walking dragline showing the action. The walking shoes are hard down on the ground, and it is just "stepping back." The illustrations to this article are by courtesy of Ruston-Bucyrus Ltd., Lincoln, England.

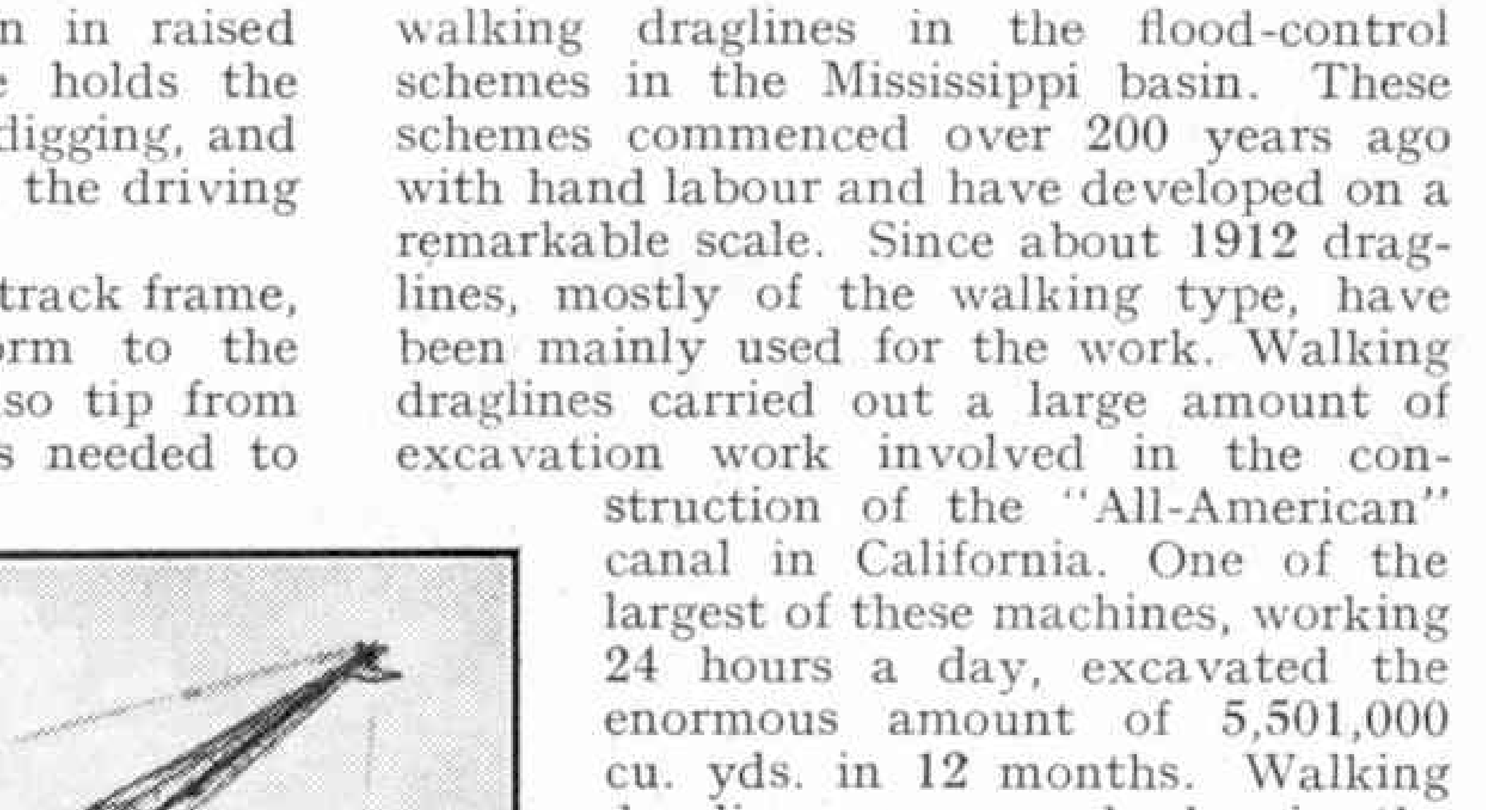
Formerly all draglines moved on rail tracks or skids and rollers; they were then fitted with creeper or caterpillar tracks. During recent years another type of machine has found favour that actually walks about by means of two enormous "shoes." This is known as the walking dragline. It was designed by the Monighan Company of Chicago, U.S.A., and found its most important use in the construction of levees or embankments on the soft ground alongside the Mississippi river. A few years ago the Monighan Company became associated with the Bucyrus Erie Company of S. Milwaukee, and the machines are now produced and marketed under the name of Bucyrus-Monighan in the U.S.A. and in this country by Ruston-Bucyrus Ltd. of Lincoln under the name of Ruston Bucyrus-Monighan. Our cover this month gives a striking impression of one of these machines, prepared from a photograph kindly supplied by Ruston-Bucyrus Ltd., of Lincoln.

The device by means of which the Bucyrus-Monighan walking dragline moves is simple. On each side of the cabin is an immense shoe with bevelled ends. In size this shoe resembles a small barge, and it is shaped like a punt. While the machine is digging the shoes are held high above the ground, and the machine rests on its circular base. When the walking machinery is put into motion the shoes are simultaneously lowered by the action of cams, and most of the weight of the dragline is transferred to them from the circular base. The machine then tilts and is made to slide forward and be lowered gently so that its entire weight rests on its base. The shoes are then raised to their highest position and at the same time moved forward ready for the next step. They are moved in the opposite direction from that towards which the boom is pointing, with the result that the machine, when travelling, appears to move backward with slow giant strides. No steering mechanism is necessary. The machine travels backwards in the direction the walking shoes are pointed, and this direction is changed simply by swinging the revolving frame. Thus the machine can side-step and make abrupt turns round and away from obstacles, or move backward and forward across the work to complete extra wide cuts without waste of time or re-handling of material.

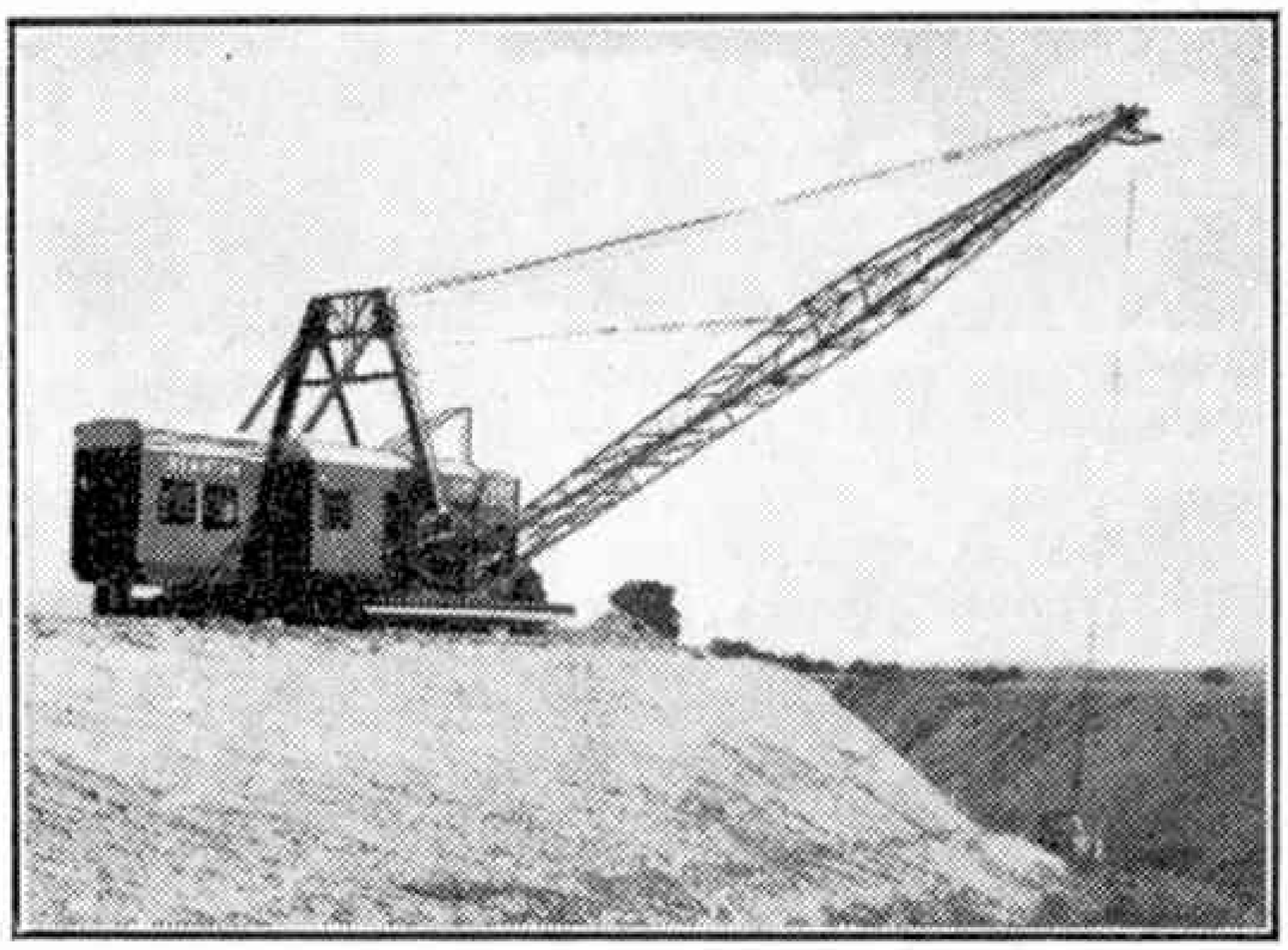
The chief advantages of the "walker" compared with a similar machine on caterpillar tracks are: less weight; longer boom or larger capacity bucket; only 5 lb. to 8 lb. bearing pressure on the ground, which is only approximately equivalent to that exerted by a man walking, and only about one-third that of the caterpillar mounted machine; simpler and fewer parts, and a lower centre of gravity.

The traction machinery is extremely strong and is free from complications. When the dragline is walking a positive jaw-clutch connects the driving-pinion with the drag drumshaft. The pinion drives the large bull-gear of the walking-shaft which rotates the cams on its squared ends. As the cam rotates in its track-frame it moves a crank-pin carrying a roller (mounted on the cam opposite the shaft) up and down in a vertical slot in the frame. The combined action of the flanged cam on the track frame with the controlled position supplied by the crank-pin gives the desired pick-up, idling-travel, lifting-action, and forward-carry of the shoes. The action of the eccentric cam on the track raises and lowers the shoe; the action of the cam and crank-pin move the shoe forward when in raised position. A spring-set brake holds the shoes in raised position while digging, and is automatically released when the driving clutch is engaged.

The shoes are hinged to the track frame, permitting side-tip to conform to the ground surface. The shoes also tip from front to back on the cam as needed to make perfect contact. When moving, the shoes are usually placed on fresh untrodden ground; but, where the "going" is extremely soft, if the shoes show a tendency to sink in too far, supporting material can easily be placed beneath them.



A Ruston Bucyrus-Monighan walking dragline stripping a bed of ironstone.



Another view of walking dragline at work.

The machines are powered either by a Diesel oil engine or electric motors when they are required to work in more or less permanent situations and electric current is available.

Reference has been made to the use of walking draglines in the flood-control schemes in the Mississippi basin. These schemes commenced over 200 years ago with hand labour and have developed on a remarkable scale. Since about 1912 draglines, mostly of the walking type, have been mainly used for the work. Walking draglines carried out a large amount of excavation work involved in the construction of the "All-American" canal in California. One of the largest of these machines, working 24 hours a day, excavated the enormous amount of 5,501,000 cu. yds. in 12 months. Walking draglines were used also in the construction of the Albert Canal that runs from Antwerp to Liege, Belgium. Machines of this type are now in use in the Nigerian tin fields, in the English ironstone mines, and on many tasks in various other parts of the world.

The machines are made in a range of 6 sizes weighing from approximately 60 to 1,000 tons, with buckets from 2 to 20 cubic yds. capacity and booms from 60 to 250 feet long.

Ruston-Bucyrus Ltd. have at present two sizes in production known as the 3W and 5W, the former with a 3 cu. yd. bucket on an 80 ft. boom, the latter with a 5 cu. yd. bucket on 120 ft. boom, alternatively with 4 cu. yd. bucket on 135 ft. boom or 2½ cu. yd. bucket on 155 ft. boom.

Copper—The Story of the Red Metal

1. Distribution and Mining

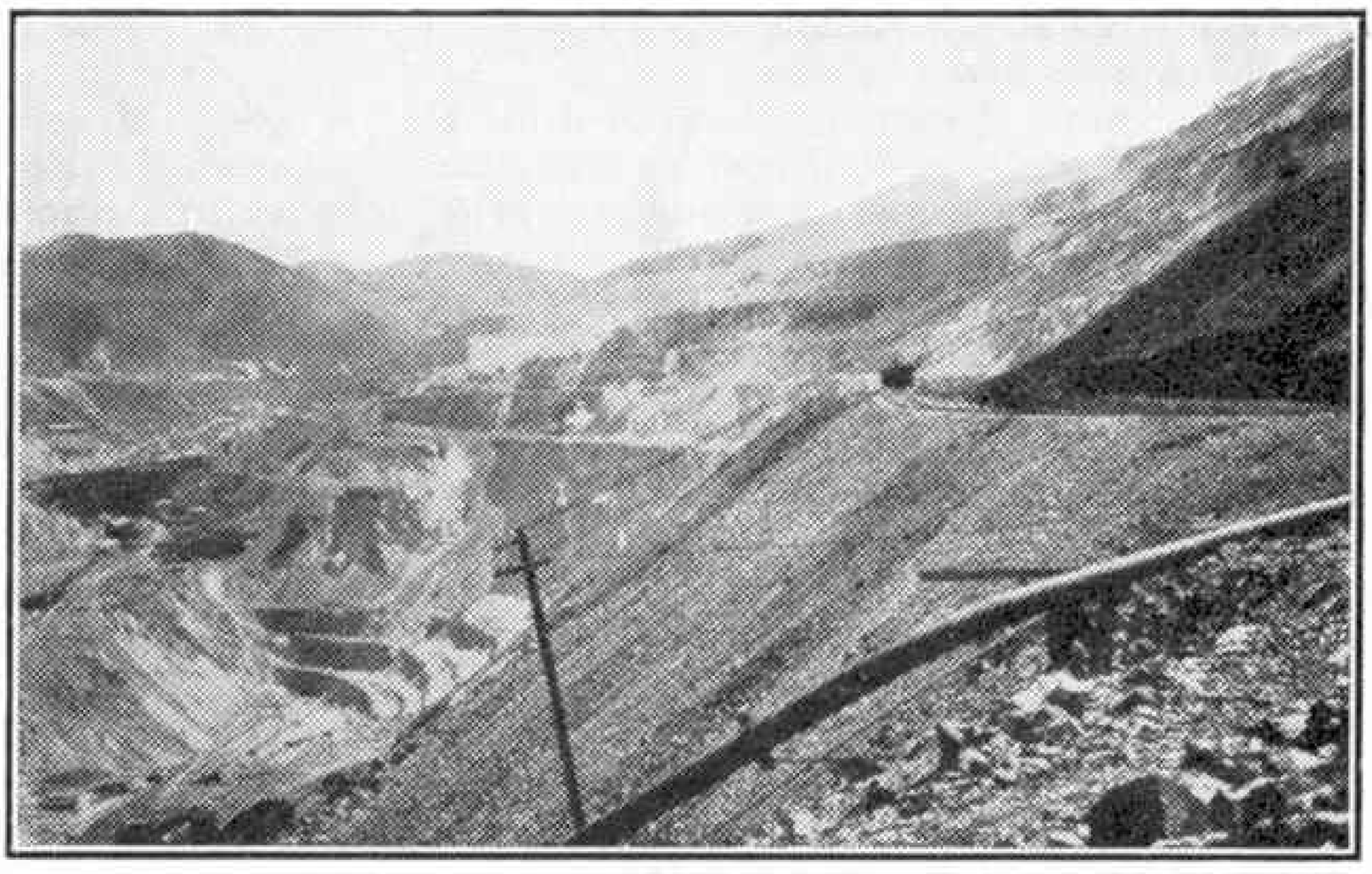
IT is probable that copper and gold were the first metals to be used by man. Both occur extensively in their native state, that is in their normal metallic condition and not in chemical combination with other elements. Further, their bright colour could not fail to attract the attention of prehistoric man. It would soon be found, however, that gold was too soft to be made into weapons or implements; whereas copper could be beaten into a variety of useful shapes, acquiring in the process sufficient hardness to be given a sharp cutting edge. This first stage of beating copper into shape probably would be followed by a second stage in which the metal was melted and cast, and a third stage in which it was smelted from its ores. No doubt there was a great lapse of time, probably many centuries, between the first and the third stages.

It is impossible to say where copper was first used, but traces of its working, dating back perhaps as far as 6000 B.C., have been discovered at various places in the regions now occupied by Iran, Iraq, Arabia, Turkey, Palestine, Egypt and Cyprus. Copper objects have been found in Iraq below the level of the clay deposit left by the Great Flood, which is believed to have occurred about 4000 B.C.

At some early stage of the period in which the process of copper smelting became known it was discovered that the addition of tin made the metal harder and therefore more valuable for weapons and implements. Very likely this discovery was due to the accidental smelting of copper ores containing tin. The Bronze Age that resulted was of vast importance in the development of early man.

Copper and bronze were in extensive use in the British Isles long before the arrival of the Romans. Bronze articles that may date back to 1800 B.C. have been found in England and Ireland, while in the latter country there is evidence that crude copper tools were made as early as 2000 B.C. The Romans mined copper on a large scale in Cumberland, North Wales, Anglesey and elsewhere, and during their occupation the art of working the metal seems to have made considerable progress. After they left, however, copper mining decayed, and it was not until towards the end of the 16th century that real progress began in the mining and smelting of the metal. Prior to this time the casting of bells from bronze had been carried on and some progress had been made in the production of guns.

By the end of the 17th century several copper works were in operation in the Neath district, and the smelting works of South Wales grew in importance until well on in the 19th century. At the end of the 18th century Great Britain supplied some 75 per cent. of all copper produced, much of it from Cornish mines; while practically the whole of the world's supply was extracted by the Swansea smelters. Then the copper deposits of Chile, Australia, North America and Spain began to be developed. At first almost all the ore came to Swansea to be smelted, but by degrees much of it began to be dealt with in the vicinity of the mines. Thus Swansea gradually lost its proud position of being the centre of the world's copper production.



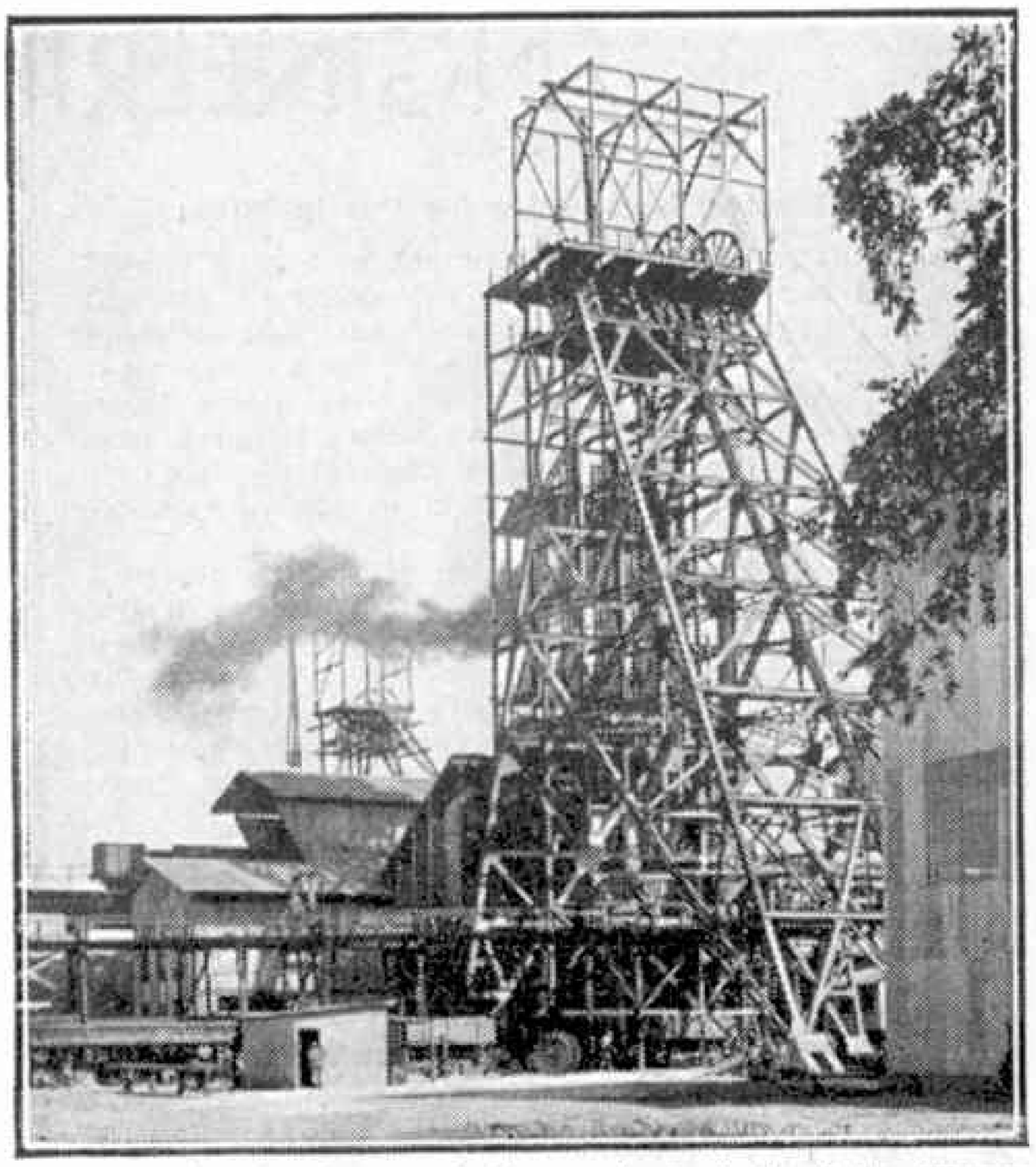
Working levels of the Utah Copper Co., Bingham, Utah. Photograph by courtesy of the General Electric Co., of New York.

Copper is obtained from minerals that are widely distributed throughout the world. Native copper is comparatively rare, the most important deposits being in the neighbourhood of Lake Superior and in certain other parts of America, and in Siberia and the Ural mountains. The most important copper ores are the sulphides, such as copper glance, which is pure sulphide, and the much commoner copper pyrites, a sulphide combined with sulphide of iron. There is also the carbonate known as malachite which, in addition to its use as a source of copper, is of value as an ornamental stone.

Large quantities of copper come from the United States, principally from Montana, Michigan and Arizona. The Montana copper mines came into existence as the result of a rumour in 1880 that gold was to be found in the Butte district. The usual rush of prospectors followed, but very little gold was found. Copper was there in abundance, but it did not interest the prospectors, who soon left to try their fortune elsewhere. There was one man, however, an Irishman named Daly, who realised the immense value of the copper ore, and when the disappointed prospectors left he bought for next to nothing the three largest copper claims. From these three claims were developed three of the greatest copper mines in the world, one of them being the famous Anaconda mine.

Copper mining on a great scale is carried on also at Bingham in the State of Utah. The district was formerly the site of prosperous gold and silver mines, and when the rich lodes worked out it seemed that the local prosperity was at an end, for although it was known that there was copper in abundance, the ore was of low grade and considered unworkable at a profit. Presently there came along a mining engineer with sufficient intelligence to see that this low-grade ore could be made to pay if treated on suitable lines. He bought out the claims of the gold company, a new company was formed, and proved so successful that in about 15 years from the beginning of operations the shareholders received some £5,000,000 in dividends. The operations were on the lines of quarrying rather than mining in the ordinary sense of the term. The miners cut their way into the hillside on a gigantic scale by means of powerful steel shovels, and in this way vast quantities of ore were obtained.

When the Lake Superior country came to be opened up in modern times there was found evidence in abundance of ancient copper workings. Large masses of copper were discovered that apparently had been too heavy for the early miners to handle. About the middle of last century copper-mining developments proceeded rapidly, and some of the most remarkable mines in the world were opened up. Enormous shafts were sunk, some of them being a mile in depth; and from the shafts the lodes were worked as far as two miles.



The hoisting headgear at the central shaft of the Nkana Mine, Northern Rhodesia.

The mineral wealth of the Rio Tinto region of Spain was known in very early times. The Phoenicians carried out gold-mining operations there on a large scale, and a large part of the wealth of Rome at the height of its glory came from this source. Subsequently the mine fell into disuse. From about the middle of the 16th century various attempts were made to work the deposits, mostly with little success; and it was not until 1873 that real progress began. Since then the mine has become the largest in the world, covering an area of about eight square miles.

Outside the United States there are several very large and important sources of copper, particularly in Canada, Africa (Rhodesia and Belgian Congo field) and Chile. The production of all these has been steadily increasing, and their reserves are enormous.

Next Month: Extraction and Alloys.

ENGINEERING NEWS

Low Electric Locomotive for Use in Mines

As an extra few inches of height in a long tunnel may call for the removal of thousands of tons of material, an electric locomotive that can operate with a high tractive effort in the confined spaces of a mine is particularly useful. One that meets these conditions very effectively has been designed and constructed by the International General Electric Co., Schenectady, U.S.A., and is seen in the illustration on this page.

The new locomotive is capable of a draw-bar pull of 7,500 lb., but its overall height, exclusive of the trolley pole, is only 26 in. The whole design is very sturdy. The overall length of the locomotive is 20 ft. 8 in. and the overall width 6 ft. 2 in. As can be seen from the illustration on this page, the framing is of very simple form, with noticeably clean lines. The wheels, have a diameter of only 23 in.

The motors work on direct current of 250 volts. They are controlled electro-pneumatically. A small controller, of tramway type, provides 10 accelerating steps, all with the motors connected in parallel, and has a hand-operated reverser. It does not control the motor circuits directly, but instead completes circuits that energise electro-pneumatic valves. These in turn release compressed air that operates air-powered contactors controlling the motor circuits. The brakes also are operated by compressed air, and a hand brake controlled by a wheel is used for holding the locomotive when at rest. Air is supplied by a compressor that is automatic in action.

The trolley-pole is very stoutly made, and can accommodate itself easily to the varying heights of trolley wire likely to be met with in a mine. Seats for the motorman and the haulage attendant are provided in recesses at the ends of the frame and, despite the fact that the locomotive is so shallow in construction, these are arranged so that both are reasonably comfortable, and are not cramped. Compressed air is used to operate the mechanism for raising the trolley pole.

The speed of the locomotive is 7 m.p.h., and its weight 30,000 lb., all of which is available for adhesion. It carries powerful headlamps, mounted on the bumpers at each end, and a warning bell.

T. R. Robinson.

Novel American Cargo Ship

The United States Navy is carrying out tests of a new kind of cargo ship that possesses several novel features. The most remarkable of these is that the vessel has a 6 ft. propeller placed amidships and driven by 16 6-cylinder petrol engines of the kind used in motorcars.

The length of this novel ship is 270 ft., and she is to be called "*Sea Otter*." Her displacement is 1,900 tons and the cargo capacity 1,500 tons. She is simple in design and so light in weight that vessels of the type can be built at inland shipyards and taken to the sea by river or canal. Construction costs are comparatively low, and another great advantage at the present time is that the building time by mass-production methods is only about two months.

Completion of a Swedish Ship Canal

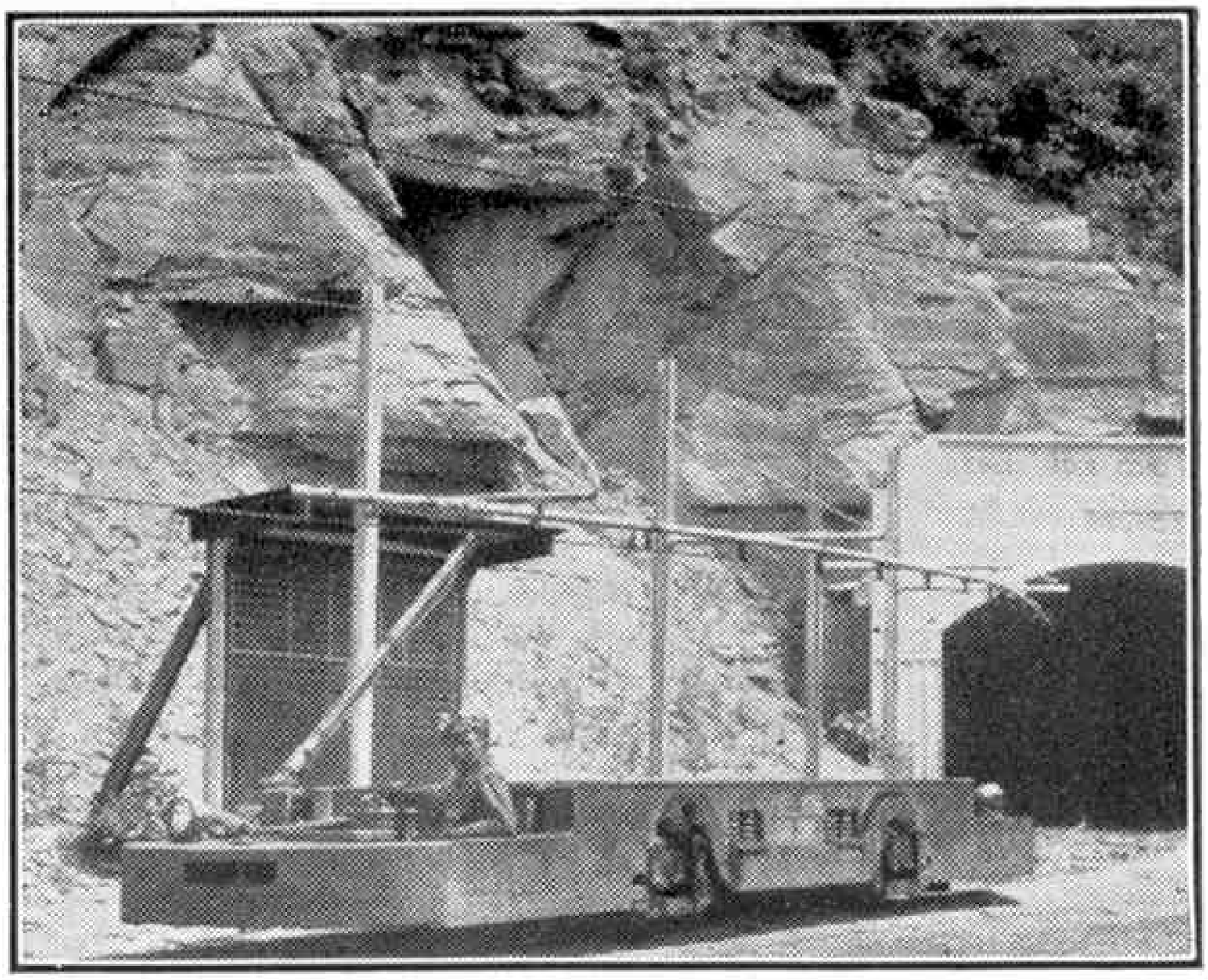
A new canal has been completed between the Baltic and the Kattegat in order to make it possible for vessels of large draught to pass inside Swedish territorial waters when leaving or entering the Baltic through the Sound, the waterway between Sweden and Denmark which connects the Kattegat with the Baltic. The new canal cuts through the Falsterbo peninsula at the southern tip of Sweden, and runs from Hollviken on the Sound to the Bight of Kampinge on the Baltic side. Its length is about 16¾ miles and its breadth varies from 44 to 110 yd., the average depth being about 24 ft., which is sufficient to allow the passage of big merchant vessels and also Sweden's largest warships.

Drying Materials for Dam Construction

In America, where many of the world's largest dams have been constructed, it is the practice to dry thoroughly all sand, gravel and other materials used in making dam cores, and special plant for the purpose has been installed at the Mud Mountain Dam now under construction in the White River Canyon, near Tacoma, Washington. Materials for the dam core are brought to the plant by train from a pit two miles away, and are passed through three large burner drums, each fitted with a special fire-box into which a continuous spray of atomised oil 7 in. in diameter is fed. Each of the burners used consumes about 330 gallons of oil an hour when operating at full capacity.

Gold from a Dam

Part of the cost of the new Friant Dam in Central Valley, California, is being met by the sale of gold recovered from the sand and gravel excavated for use as aggregate in the concrete used in the work. The monthly average is nearly 10,000 dollars.



The first of a new type of low height electric locomotives. It is at work at the mines of the Jewell Ridge Coal Corporation, in the United States, and entry to the workings is by a tunnel instead of the more usual shaft. Photograph by courtesy of the General Electric Company, of New York.

A Portable Welding Machine

The illustration on this page shows a portable butt welding machine of a type used extensively in electrical works for welding copper wires. The machine is suspended from overhead and is provided with a balance weight so that it may easily be brought to any desired position. It is self-contained, being fitted with its own transformer, which is provided with a range of five voltage tappings for supplying current for welding different sectional areas, and is provided with quick-grip jaws in which the sections to be welded are clamped. The welding operation is entirely automatic.

This is one of many different types of welding plant manufactured by the Metropolitan-Vickers Electrical Co. Ltd.

Castings Made from Stone

After many years of intensive research a process has been developed for producing castings from basaltic stone. The stone is first crushed and graded, and then fed into high temperature furnaces and fused. The actual casting process is very like that used for casting steel or iron, the fused material being poured into moulds, which then pass through tempering kilns. In these they remain for about two days, and as a result of this treatment the basalt acquires a very dense crystalline structure. Castings produced in this way are said to be particularly suitable for lining bunkers, chutes, troughs and similar devices that have to resist abrasive action.

Grand Coulee Dam Starts Work

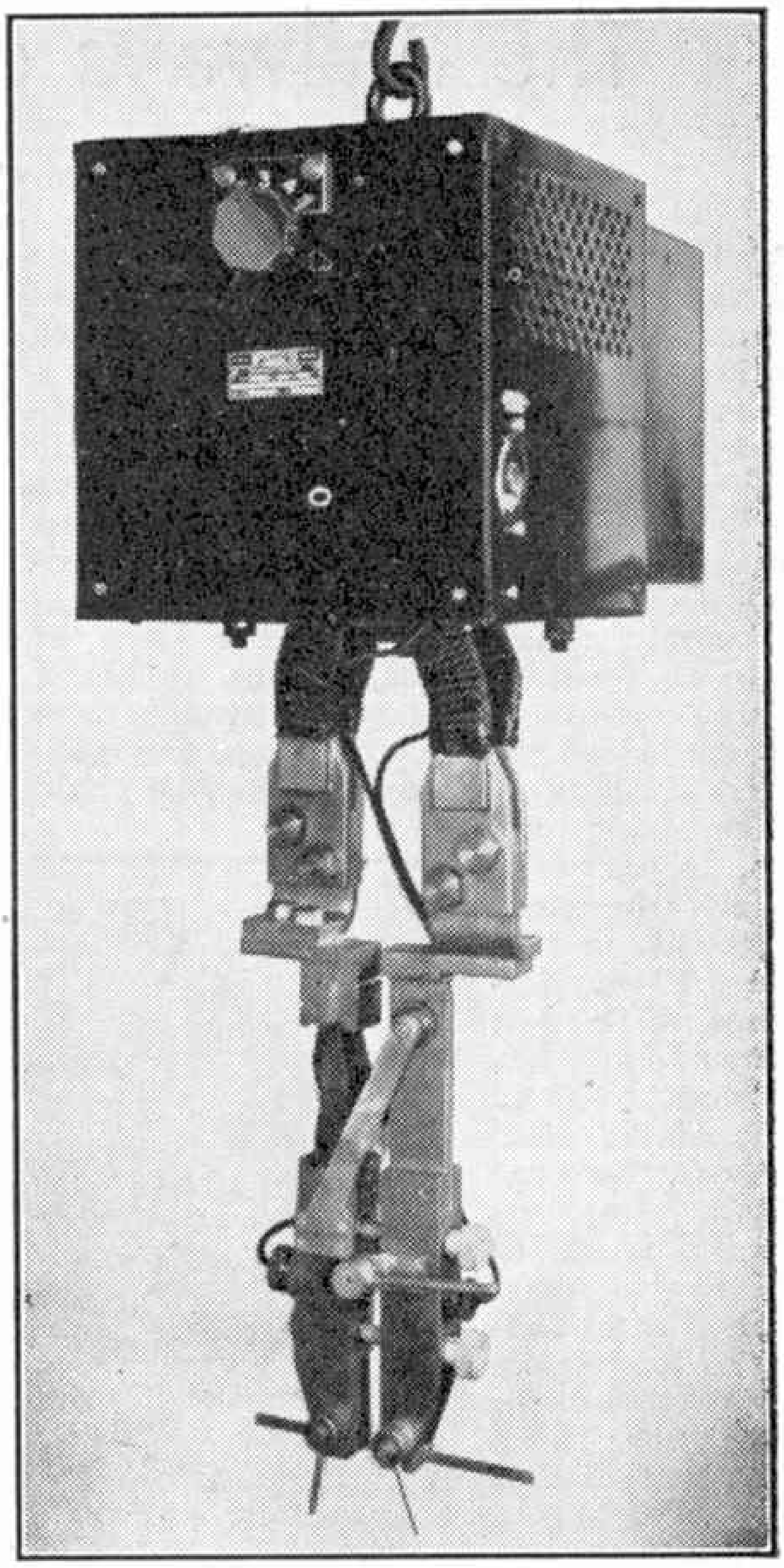
The first two water-driven turbine generators, known as "station service" generators, are now in action at the Grand Coulee Dam on the Columbia River, turning the energy of falling water into electric power. These two units each produce 10,000 kW., and until the first main generating plants are installed will supply power to a line connecting the Grand Coulee Dam to Bonneville Dam, lower down the Columbia, in order to augment the power supplied by the latter. Later, when the main generators are installed, the output of the service generators will be used for lighting, heating and operating machinery at the Grand Coulee Dam itself. The Grand Coulee Dam was described in the issues of the "*M.M.*" for November and December 1937, and an illustrated account of the Bonneville Dam appears on page 370 of the December 1941 issue.

When the Grand Coulee plant is complete it will consist of 21 power generators, which will completely dwarf the present service generators. Of these units 18 will generate 108,000 kW., and there will be three other smaller units each rated at 10,000 kW. Each of the larger generators will be 24 ft. in height and 44 ft. in diameter, and will contain in their windings about 300 miles of copper wire.

Visitors to the Dam will soon be able to inspect a complete scale model of the great structure. This is to be erected on a permanent parking place now being excavated near the east end of the dam. They will thus be able to visualise the scope of the whole project, only part of which can be seen from any one point. The model, built of concrete to a scale of 1 to 60, will cover an area measuring over 100 ft. long and 72 ft. wide, and will include a scale section of 5,000 ft. of the downstream portion of the river, through which water will flow.

A Giant Searchlight

A great searchlight with a beam so powerful that it is possible to read a newspaper by its light 12 miles away has recently been completed in Canada. It has been built for harbour defence purposes, and its beam is rated at 800,000 candle power, with an effective range of 35,000 ft. The lens of the unit is 5 ft. in diameter, and power for the arc is supplied by a portable oil engine generator, which produces a current of 150 amp. at 78 v. The arc burns about 8 in. of negative carbon and 16 in. of positive carbon every hour.



A portable butt welding machine manufactured by Metropolitan-Vickers Electrical Co. Ltd., to whom we are indebted for our illustration.

An Electric Generator Driven by Wind Power

A wind-driven electric generator, which is said to be the first to be connected in a power-transmission system, was taken into service recently in the Central Vermont Public Service Corporation, in the United States.

The alternator is rated at 1,000 kW at 600 r.p.m., and has two huge wind vanes or propellers, each with a wing spread of 175 ft. It is mounted on top of a tower 110 ft. in height built on a hill, the total height of the plant above sea level being 2000 ft.

During a test run an output of 800 kW was obtained with a wind velocity of 26 miles per hour.

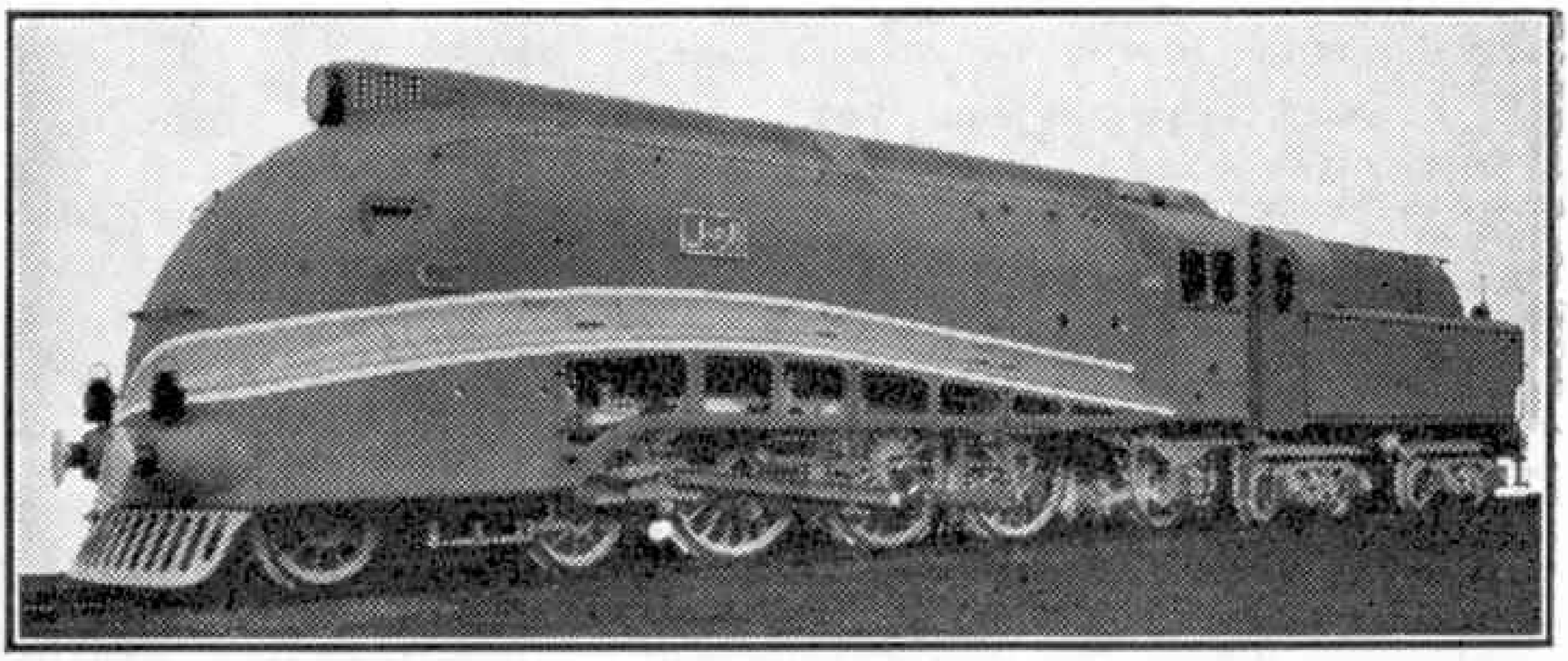
The World's Oil Tankers

After allowing for recent sinkings, the total tonnage of tanker ships in the world is about 17,000,000 to 18,000,000 tons. Nearly 70 per cent of this total is under the British, United States, and Norwegian flags. Panama and the Netherlands own about 10 per cent, while the Axis Powers, Italy, Japan and Germany between them operate 10 per cent.

The Railways of Iraq and Iran

By "A Railway Engineer"

RECENT events in the Middle East have brought into prominence the twin countries of Iraq and Iran, better known perhaps by their older names of Mesopotamia and Persia. The terrain in both countries is very difficult, though sharply contrasting in its character, and as means of communication the railways are thus particularly vital. In the seemingly boundless deserts of Iraq, and again in the rugged mountain ranges of Iran, the story of railway operation has, for us at home, that same fascinating appeal of all remote lands; indeed the background to the story is as thrilling and romantic as one could wish. This was the country in which the great "Revolt in the Desert" was fostered in the last World War, though it was on the Hejaz Railway farther west that the immortal Lawrence of Arabia practised the brilliant guerrilla tactics that earned for him the Arab name of "Destroyer of Engines."

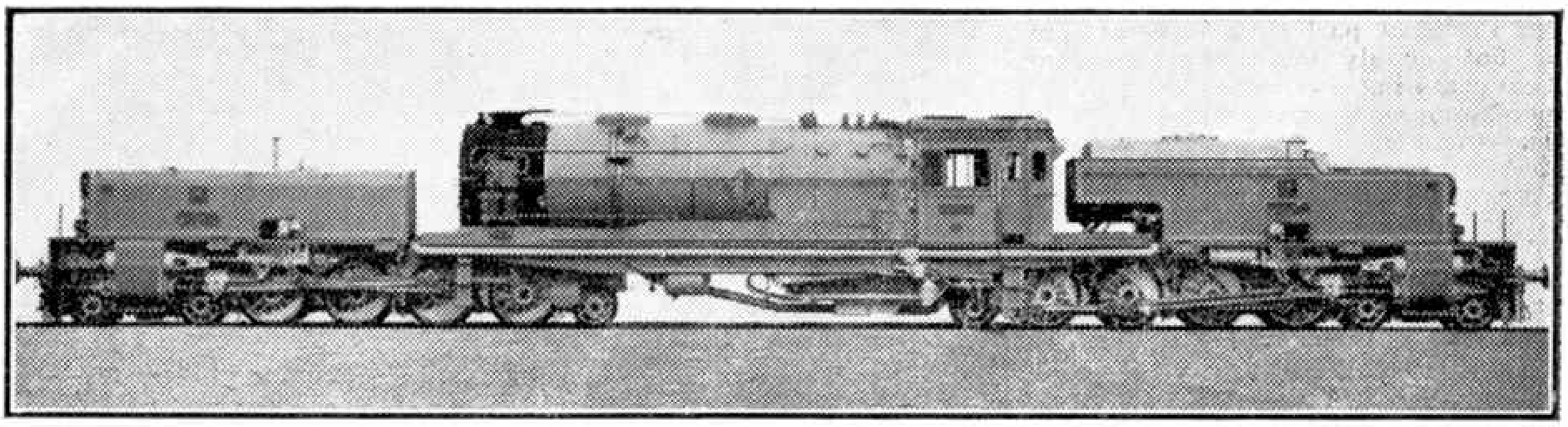


New streamlined "Pacific" locomotive for the Iraqi State Railways. Photograph by courtesy of Robert Stephenson and Hawthorns Ltd.

At the beginning of the last war there was only one short railway in Iraq, though it actually formed part of a great scheme for linking Baghdad with Haidar Pacha, on the Bosphorus, just across the water from Istanbul. The Iraqi section began at Baghdad and ran north for 74 miles through a sandy desert to Samarra. It had been built as a result of German commercial enterprise, and all the equipment and rolling stock came from Germany. I should add that then the whole of Mesopotamia, with Syria and Palestine too, was under Turkish rule. Turkey entered the war on the German side at the end of 1914, and in the following year a British Expeditionary force invaded Mesopotamia from the Persian Gulf, one column working its way up the course of the Euphrates river, and a second up the Tigris. To serve this force hastily-built military railways were constructed northward from Basra, and the western of these, that following the Euphrates, eventually became the main trunk line of the Iraqi State Railways.

Quite apart from all the alarms and incidentals of a military campaign, there were numerous problems to be solved by the Director of Railways. Foremost among these was the gauge to be adopted. Railway gauges in many parts of the world have been settled in divers ways, resulting in a somewhat chaotic lack of standardisation; but nowhere can the final decision have been made for more curious reasons than on the Basra-Baghdad line in Iraq. As with the British force recently operating in Iran, the expedition of 1915 was organised and supplied from India, and only such railway rolling stock as could be spared was sent. This was of four different gauges—2 ft., 2 ft. 6 in., metre, and 5 ft. 6 in.! A bewildering selection if you like, especially as eventual linking up with the German-built section north of Baghdad was envisaged. The latter line was laid to 4 ft. 8½ in. gauge! The railway authorities in Mesopotamia never knew from month to month what stock was coming from India, and so the military lines were built to suit the engines and vehicles on hand. The Euphrates line was laid on the metre gauge, and that following the Tigris to 2 ft. 6 in.; I cannot trace that any 5 ft. 6 in. rolling stock was sent, though of course the gauge is common in India.

Earthworks were naturally kept down to a minimum, and the bridges were rough-and-ready structures supported on timber



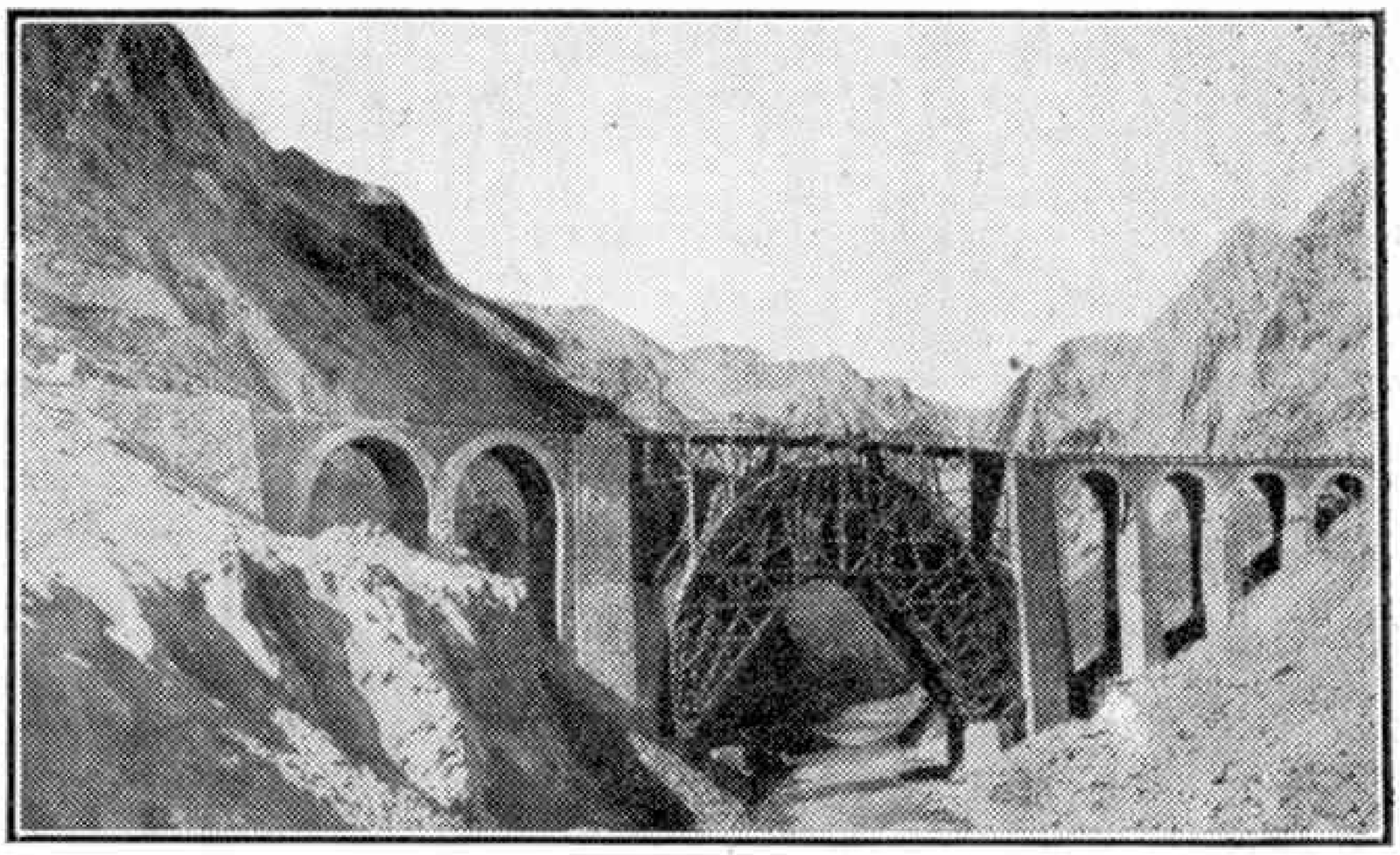
One of the enormous Beyer-Garratt engines now at work on the Northern section of the Trans-Iranian Railway. Photograph by courtesy of Beyer, Peacock and Co. Ltd.

piles. One of the most remarkable of these bridges was that across the old Euphrates, at Qurna, which was no less than 900 ft. long. The Tigris line has now been dismantled, and the western route extended to Baghdad; over this historic route, 353 miles in length, there were, prior to the outbreak of trouble in Iraq, two regular passenger trains in each direction daily. Of these the mail, a dining car express, covered the whole distance from Basra to Baghdad in 14 hours. The completion of this route was begun before the end of the war, after the British force had reached and occupied Baghdad. Considerable difficulty in construction was caused by the shimmer in the Northern part of the desert; here the alignment of the railway was set out by making tall columns of smoke, on which the surveyors sighted their instruments.

Floods were a constant cause of trouble. Only after a part of the line had actually been constructed was it found, by severe practical experience, that the route chosen was not the best. In this locality the railway, and indeed the whole country, was under a positive sea of flood water, stretching as far as the eye could see. One of the engineers climbed a tall pile-driver to survey this extraordinary scene, and sighted a ridge of higher ground that was above the water; it was thereupon decided to change the route to run along this ridge, above flood-water level.

Before leaving the southern line I must briefly mention the rolling stock. The locomotives sent from India were mostly reliable enough, but then to augment the stud someone had the bright idea of drafting to Iraq, some American-built Mallet compounds of the 0–6–0 + 0–6–0 wheel arrangement. These, I believe, had been built for the Archangel line in Russia, and were built to Russian specifications. What their tractive power was I do not know, but they developed the alarming habit of shedding their entire motion, while running at speed!

The standard-gauge line northward from Baghdad was completed to the Syrian frontier just before the outbreak of the present war. It follows the Tigris for practically the whole distance, and serves the important oil centre of Mosul. Unlike the metre-gauge route to the South, it was planned from the outset as a first-class main line, and that ambitious speed developments are now on hand may be assumed from the purchase from England of some streamlined "Pacific" locomotives; speeds up to 65 m.p.h. between stops are now proposed. The line, although running



A bridge on the northern section of the railway. Photograph by courtesy of Richard Costain Ltd.

for the most part through desert lands, is not unduly difficult, though some heavy cutting work and tunnelling was necessary near Mosul. Careful provision had to be made for dealing with flood water in many parts of the line, and embankments were built with openings at intervals through which the water could pass. The stations on this line are provided with a simple arrangement of signalling using characteristically British lower-quadrant semaphore signals. And so, in 1940, the long-cherished dream of a through train service from the Bosphorus to Baghdad was realised, though happily under British and other anti-Axis influence.

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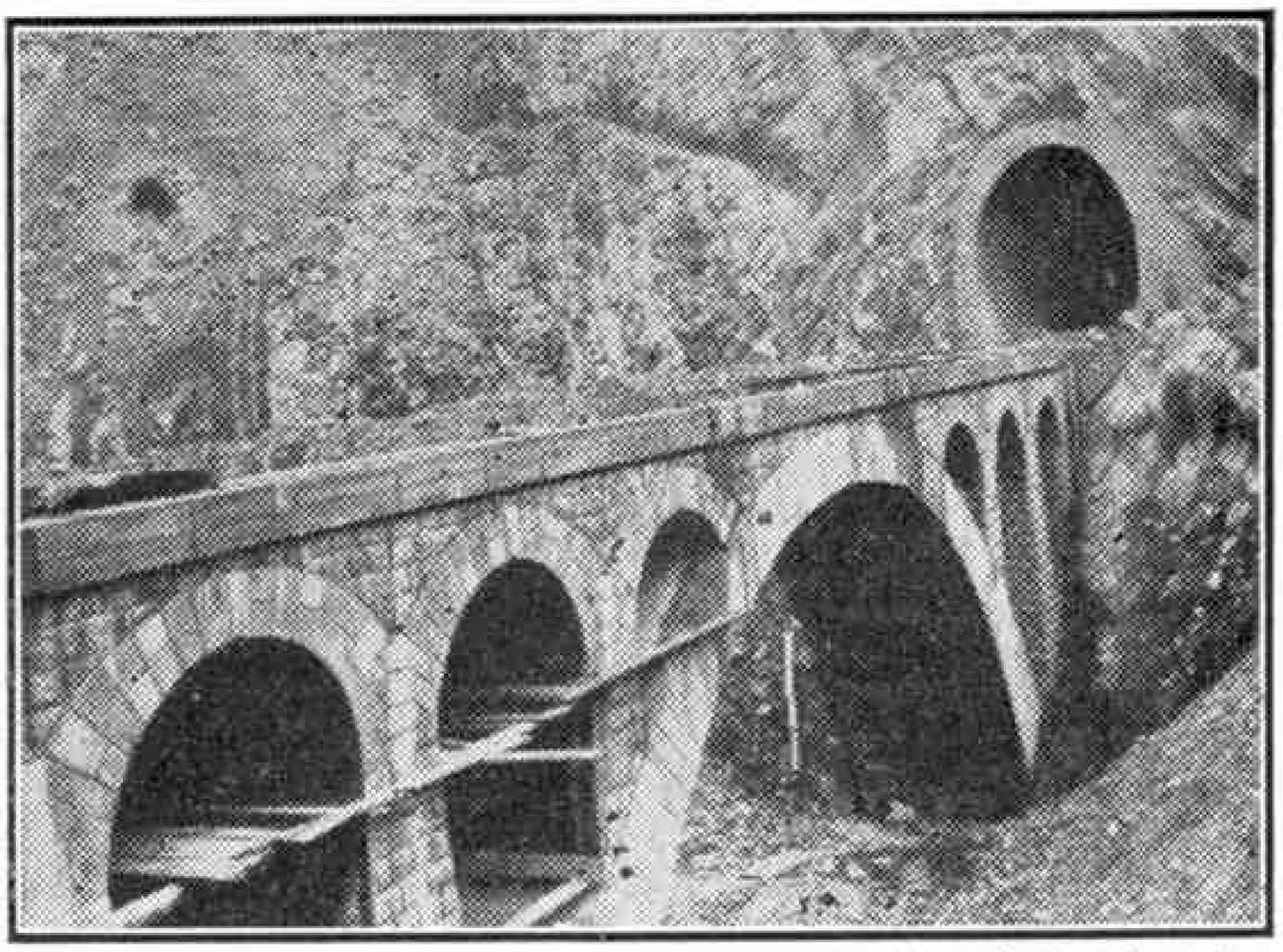
The railways of Iran afford in every way a striking contrast to those of the neighbour country. It's one great trunk line, linking the Caspian Sea with the Persian Gulf, was not conceived in the turmoil of a desert war, nor as part of a hectic race for commercial domination by interested European countries. The Trans-Iranian line was planned in Iran itself, to give social and political benefits to the Iranian people. Foreigners it is true, were engaged on the preparation of the scheme and the constructional work, but strictly as servants of the Iranian state. The story of the building has a poignant interest to-day, for the moving spirit of the whole enterprise was the Shah, whose abdication followed the British and Russian military occupation of the country.

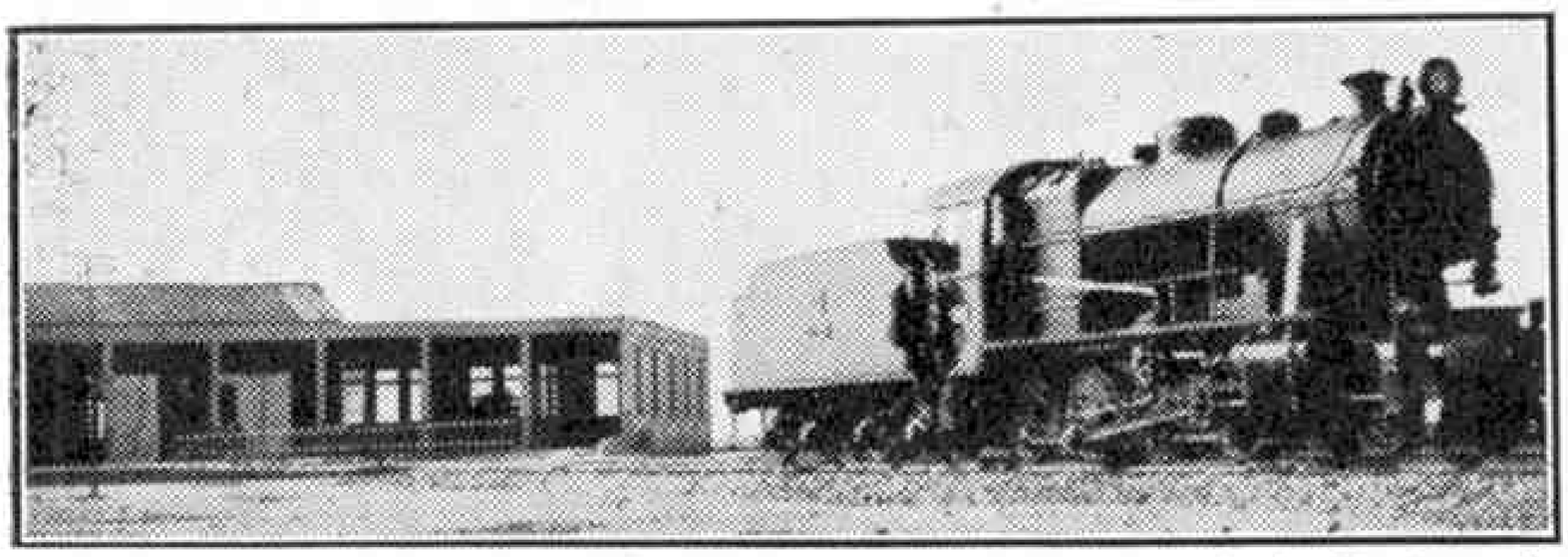
The building of the railway was at first entrusted entirely to outside bodies, the Southern to an American syndicate and the Northern to a German firm. Progress did not satisfy the Shah, for about 10 years ago the Iranian Ministry of Railways took over both sections, and appointed certain Swedish and American engineers as consultants. This international body did not prove very successful, and was frequently at loggerheads. There is a story about the tremendous Savad-Kuh incline by which the Northern section climbs from Bandar Shah to its summit point in the Elburz mountains. The Swedes recommended a gradient of 1 in 30, but the Americans insisted that nothing steeper than 1 in 43½ was desirable. Matters having reached a deadlock, the Shah himself took a hand, and by the simple process of taking the mean, decreed that the gradient should be 1 in 36. And as such the line was constructed. The upshot of this, and other differences of opinion, was that the Swedes and Americans were replaced by Danish consultants.

Enough, however, of the squabbles of so-called "experts," the rivalry of powerful business interests, and behind all the tremendous despotic personality of the Shah. From all this complex affair, which reads almost like a fairy tale, and, so far as the Shah is concerned, has had something of a fairy tale ending, there has emerged one of the grandest pieces of railway engineering to be found anywhere in the world.



A tunnel portal. Photograph by courtesy of Richard Costain Ltd.

The Garratt type of locomotive used on the Northern section is designed to provide the haulage power of two engines without the expense of having two sets of enginemen. The locomotive illustrated has a tractive effort of no less than 54,400 lb.—considerably more than that of the most powerful passenger engine in this country—yet having no greater axle load than 15 tons, against the 22, or so, tons common here. This means that a lighter section of rail can be used in Iran, and the bridges can be less robust than otherwise. I do not mean to suggest by this that constructional work has been skimped; indeed the line through the mountains is a veritable monument to the care and engineering skill of the contractors. Great difficulties were experienced, not only on account of the steepness of the hillsides, but because the ground in many places was "rotten," and consisted largely of rough loose scree. For long stretches heavy retaining walls had to be built to support and protect the railway. In contrast to prevalent practice elsewhere, instead of using concrete the bridges and retaining walls were built in red sandstone, of which a good quality was available locally. This Northern section has been completed quite recently. The Southern section provided some equally difficult engineering work. It is here that a British firm, Richard Costain Ltd., built one of the most difficult sections.



A Beyer-Peacock 2-8-0 locomotive outside Ahwaz running shed. Photograph by courtesy of Beyer, Peacock and Co. Ltd.

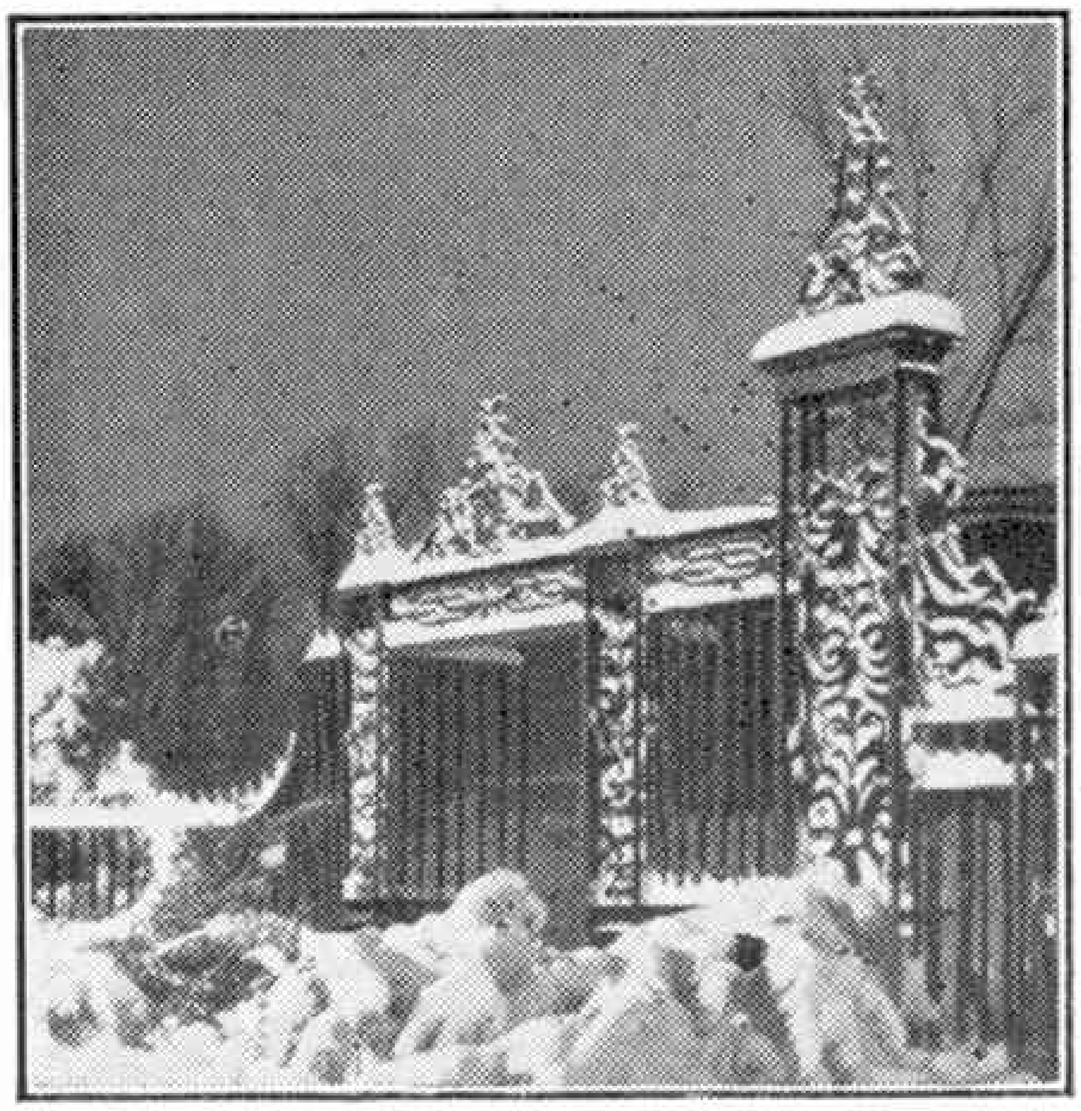
Apart from the giant Beyer-Garratt engines, which were designed specially for the Northern section, the same firm have supplied some very fine 2-8-0 tender engines. These are used on the Southern section of the line where the ruling gradient is much easier, only 1 in 67; up inclines of this steepness the Beyer-Peacock 2-8-0s haul 400-ton loads at a sustained speed of 16 m.p.h. The Garratts and the 2-8-0s are oil fired. In view of the number of European countries that have, at one time or other, been connected with the Iranian railways, it is not surprising that many foreign builds of locomotives are at work. There are German and Swedish locomotives, and most of the rolling stock is of Continental make too; while just before the outbreak of the present war several Czech engine drivers were engaged and began work. Now comes the news that English 2-8-0s of both L.M.S. and L.N.E.R. design have been fitted for oil-firing for service on this line.

Photography

Taking Pictures in the Snow

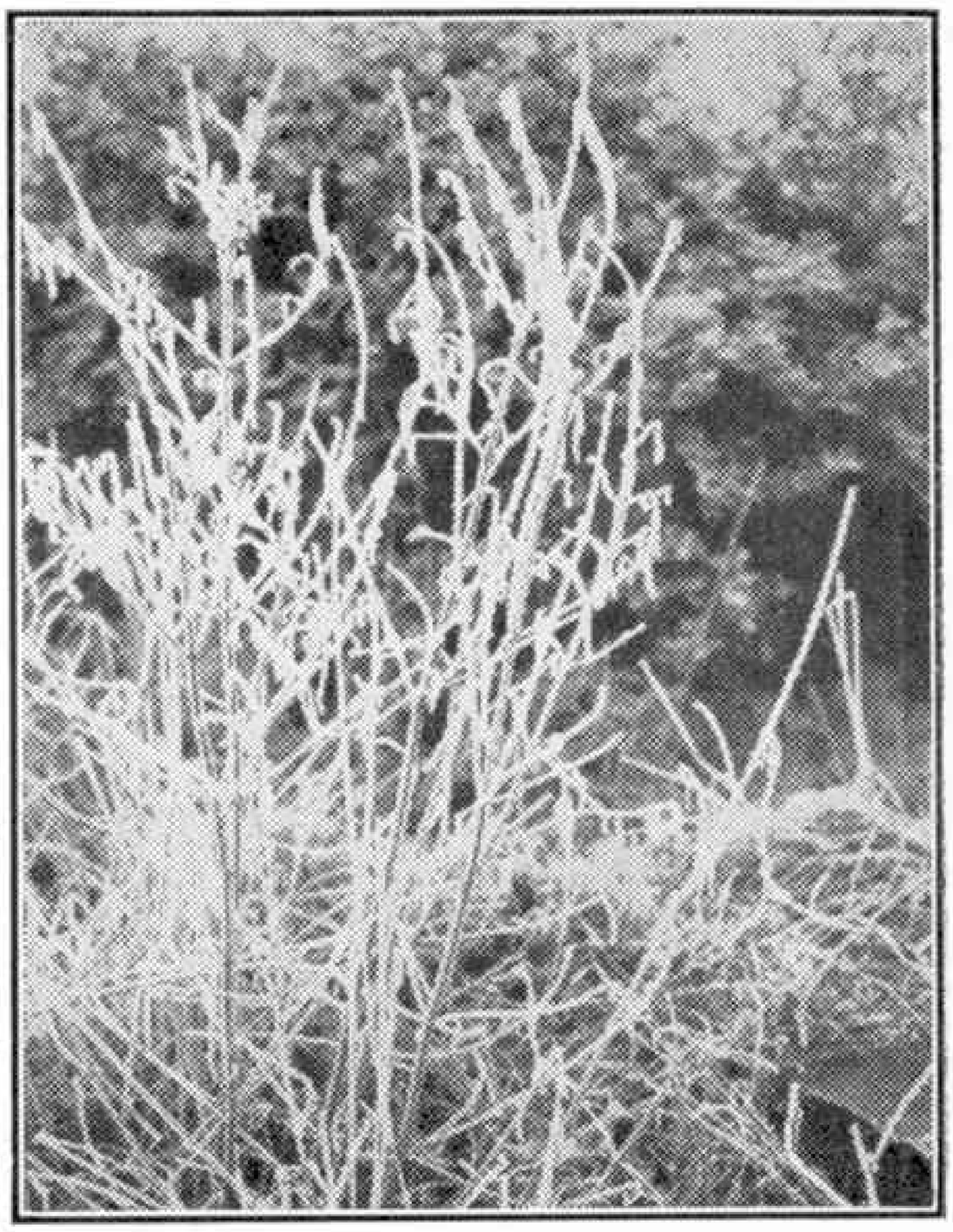
UNFORTUNATELY, there are few chances in this country of photographing really good snow scenes. There is always the possibility of a heavy downfall during the next few weeks, but as a rule the snowy periods are short. This makes it all the more important that the photographer should have his camera ready to seize the opportunity when it comes his way.

The most successful snow pictures, especially in towns, are taken in the morning as soon as the light becomes strong enough. An open expanse of snow-covered ground looks very attractive in the morning sunshine, but it usually makes a disappointing picture, flat and uninteresting. A scene should be chosen in which the white covering is broken in the foreground by trees, shrubs, walls, fences or something of that kind, to provide dark patches to give contrast. Sometimes an effective picture can be obtained by making tracks across the newly-fallen snow in the foreground; and one or two figures in



A beautiful snow picture photographed by the light of a street lamp at night. It is the work of W. M. Goltra, Crawfordsville, U.S.A.

suitable positions are useful. The long shadows of trees thrown across the snow are particularly effective, and many beautiful pictures can be made of them. Children playing in the snow, rolling a big snowball or building a snowman, provide



Hoarfrost on a tuft of dead grass provided this beautiful subject for H. Bastin, Reading.

good opportunities.

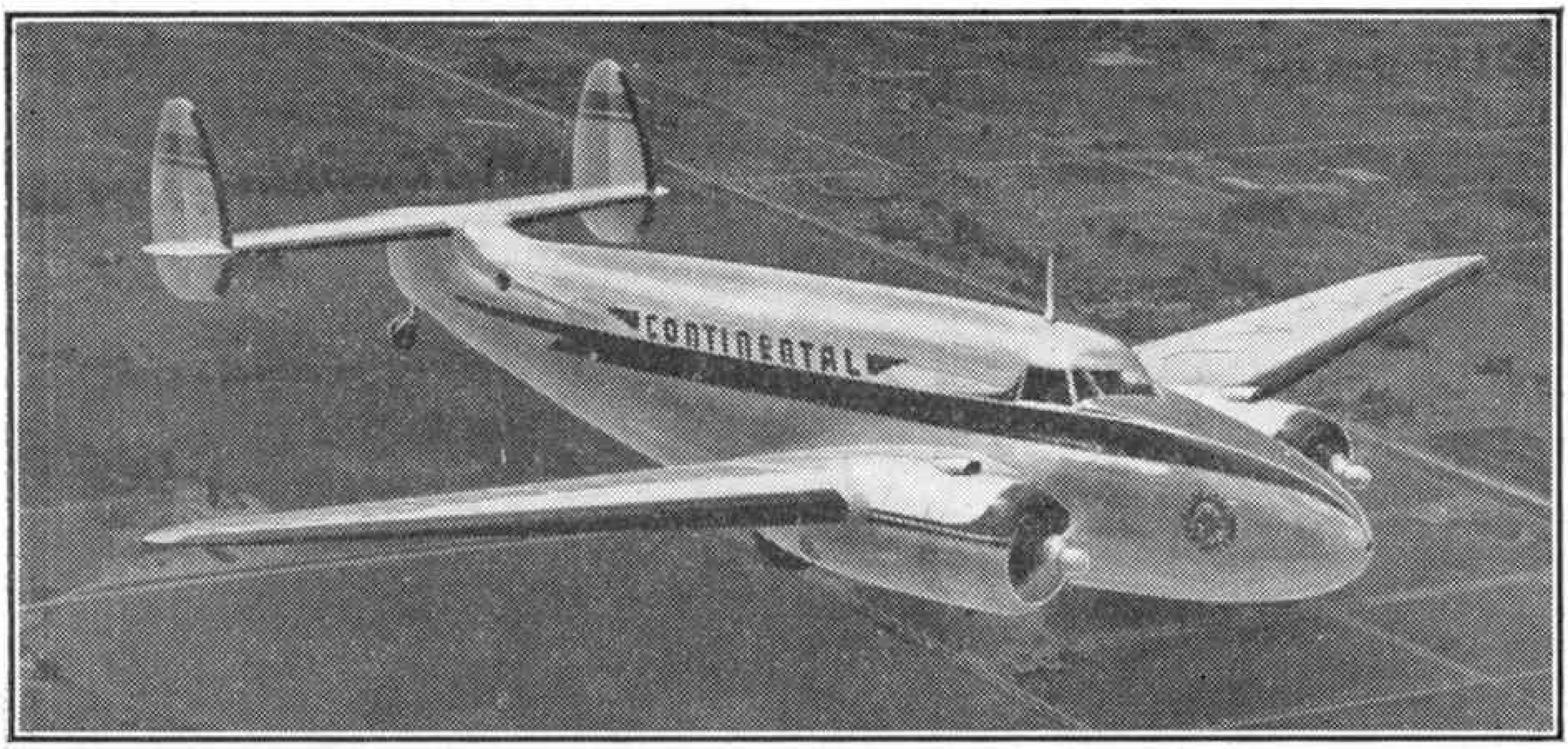
Winter sports such as skating or sledging make excellent subjects, and curling is particularly good on account of the slow movement. Pictures of this kind should always be taken in bright sunshine, otherwise they look dull.

Pictures of falling snow are difficult to make. The essentials are snow that is falling gently and in large flakes; a dark background such as a building against which the flakes stand out, and some kind of shelter over the camera, such as a porch or even an umbrella, to prevent flakes falling within a few feet of the lens and causing blurring.

Foreground pictures of the delicate frost tracery on bushes and small trees are always effective.

Out in the country a good fall of snow provides a great variety of subjects, especially if the district is fairly well wooded, and with a river or stream winding about. The woods provide dark contrast, and a picture of a curving stretch of a frozen stream is often very attractive.

One small but important point must be mentioned. While you are out in the open hunting for pictures, wear warm gloves and keep your hands in them until the actual taking of a picture. Many opportunities have been lost through awkward manipulation of the camera with numb fingers.



A Lockheed "Lodestar" transport of Continental Air Lines, Inc. Photograph by courtesy of Lockheed Aircraft Corporation, U.S.A.

Air News

The "Hurricane" now a Fighter-Bomber

On 1st November last year, the world famous Hawker "Hurricane" appeared in a new role, that of fighter-bomber, when a squadron of the Royal Canadian Air Force equipped with these latest machines attacked targets in Northern France with good results.

In its new form the "Hurricane" carries two 250 lb. bombs in external racks under the wings. It flies very low and fast to the chosen target, climbs slightly when nearing it, and then dives on to it and drops the bombs, usually both at the same time. The delayed action fuses of the bombs allow the machine to get a good distance away before the explosions occur. The "Hurricane" IIB, as this new version is called, is armed with 12 machine guns, so that when rid of the bombs it becomes the familiar heavily-armed fighter. The additional weight of the bomb load has only reduced the speed of the machine by about 15 m.p.h., and this slight slowing down is made good, of course, immediately the bombs have been released.

Fast Atlantic Ferry Flights

A recent crossing by air of the Atlantic twice in 19½ hrs. is claimed as a world record flight. It was achieved by a young American pilot engaged on transatlantic ferry work. He took off from a British airport shortly before dawn, and was in Newfoundland for lunch, then took over another machine for Britain and set off back to this country. A favourable wind aided his speedy return, and he made a successful night landing at the airport from which he had taken off early the same day.

The record for an eastward crossing of the Atlantic by a Ferry Command aircraft has been broken twice within a week by Consolidated "Liberators." The record time now is 8 hrs. 20 min., achieved by Capt. Cramer, an American pilot, on 4th December last year. This beat by 3 min. the record set up on 1st December by Capt. O. P. Jones, who before the war was a well-known British Airways and Imperial Airways pilot. The previous best time for a west-to-east transatlantic flight was 8 hrs. 45 min., by a "Liberator" and also by a Boeing "Fortress."

Success of American Bombers

When speaking recently of the American-built bombers used by the R.A.F., Major-General H. H. Arnold, Chief of the U.S. Army Air Forces, stated that the Consolidated "Liberator" bombers are now provided with four cannon, anti-submarine devices, and depth charges. In a reference to the Boeing "Fortresses" of the R.A.F., he said the operational height of these bombers had been increased to 34,000 ft.

An Aeroplane that Flies Without an Airscrew

An aeroplane that can fly without an airscrew has been designed by an Italian aircraft designer named Campini and constructed by the Caproni factory, in Italy. It is a monoplane, and is propelled by taking in air through the nose of the fuselage, compressing it, and expelling it through the rear of the fuselage, a system called "jet-propulsion." This unusual machine first appeared at Milan in 1940 and was reported to have made several successful trial flights. There was no further news of it until early last month, when it was said to have flown from Milan to Rome, covering the 340 miles in 2¼ hrs., which gives an average speed of 151.1 m.p.h. A few days later it was reported to have flown over Rome.

R.A.F. Norwegian "Navigator"

The crew of an R.A.F. Coastal Command "Blenheim" aircraft bound for Norway took a Norwegian officer with them. As the machine approached the coast the Norwegian shouted to the R.A.F. navigator "Leave it to me now," and began to demonstrate the advantage of local knowledge.

A mountain loomed ahead, and the pilot pulled back the stick and began to climb.

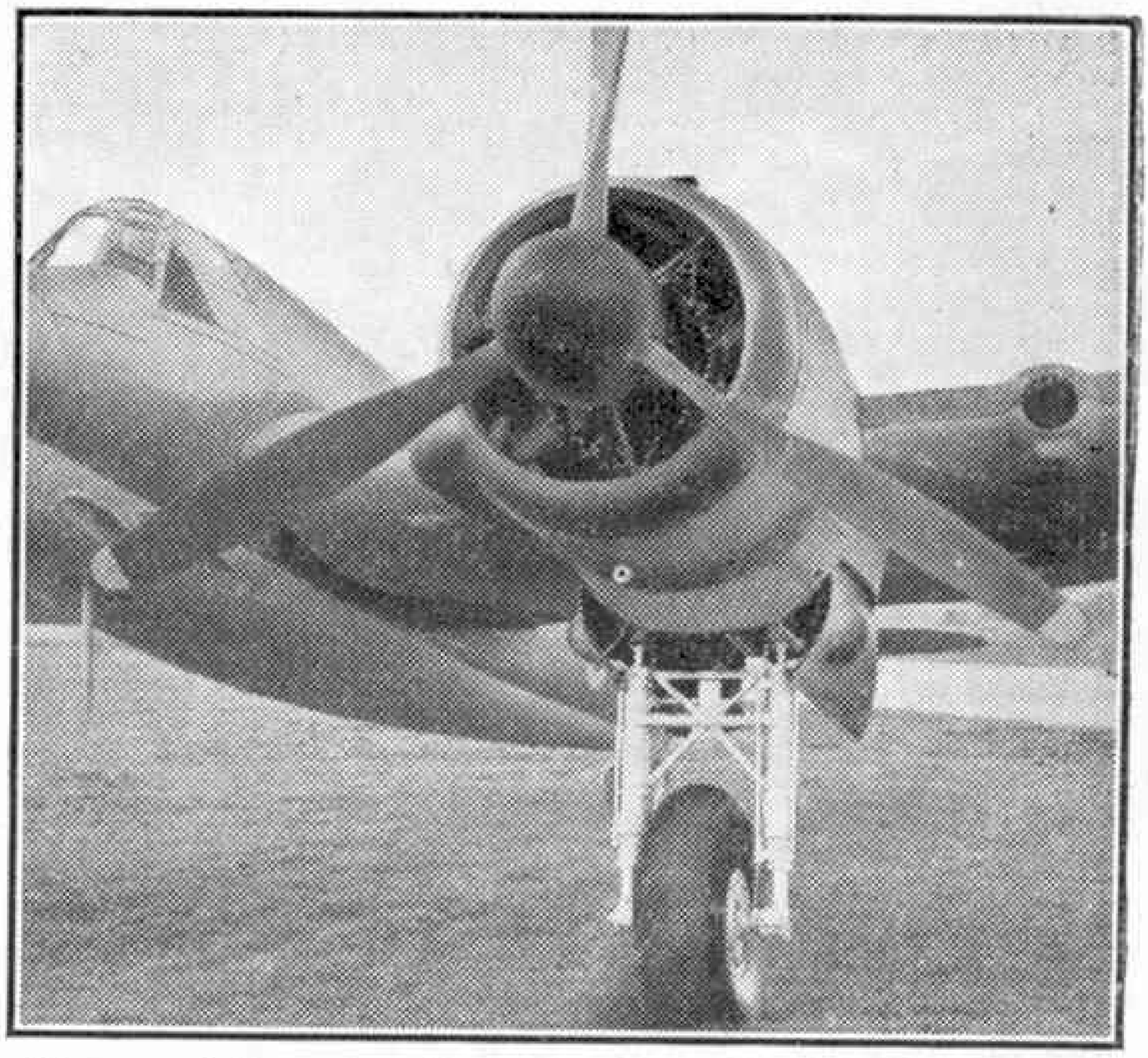
"No, no," cried the temporary navigator. "Go down."

Somewhat doubtfully the pilot obeyed. When he was low over the water he received further instructions: "Right . . . Left . . . Left again." So the machine was taken over occupied territory without being spotted. In and out of fjords and round the sides of mountains flew the "Blenheim" in response to the Norwegian's commands: "Up, down, right, left."

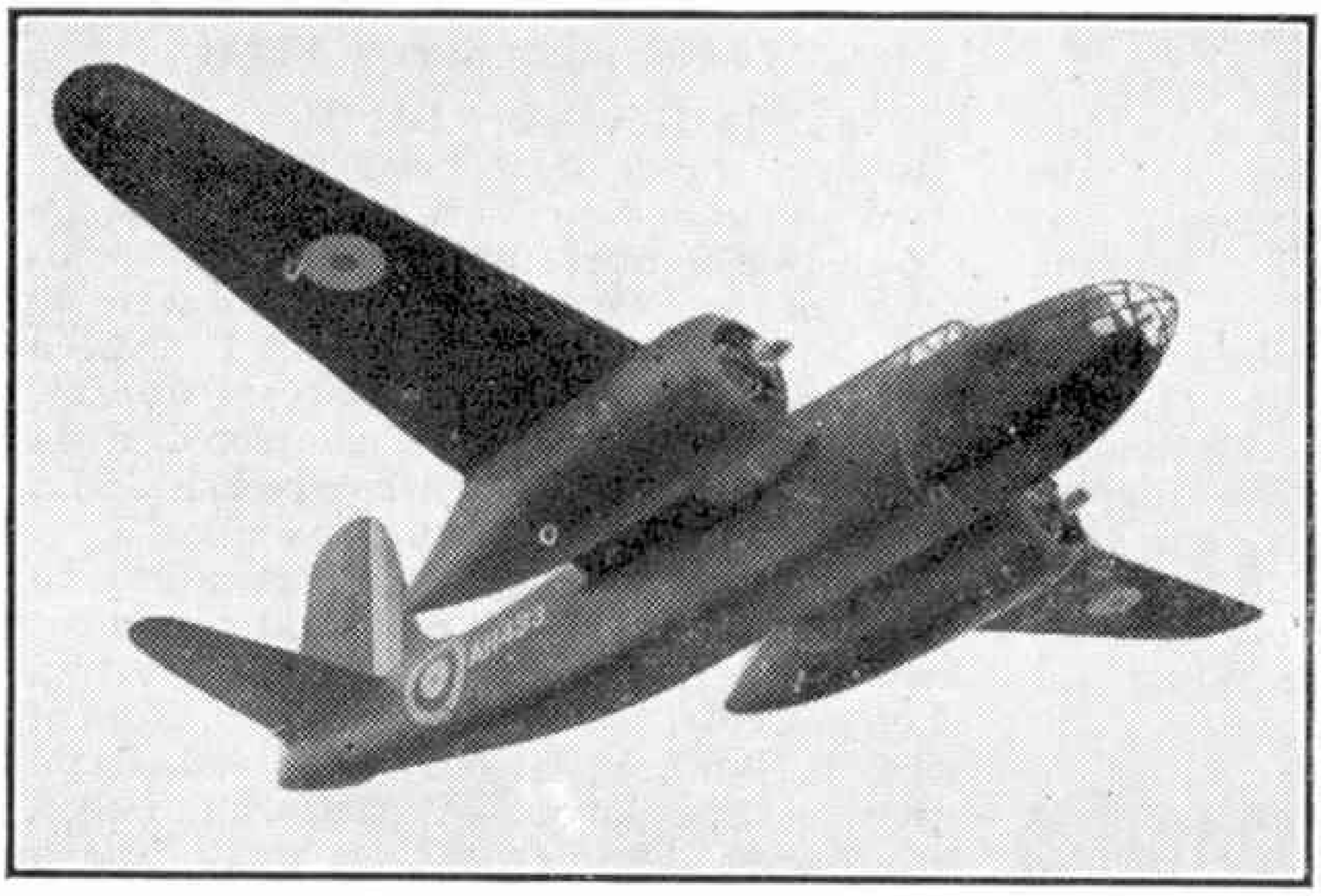
When the machine returned to base the R.A.F. navigator summed up the Norwegian's performance by declaring "He had me completely lost. It was a wizard show; but I was disappointed when he didn't take us up the main street of Bergen and tell us to pull up at the traffic lights."

* * * *

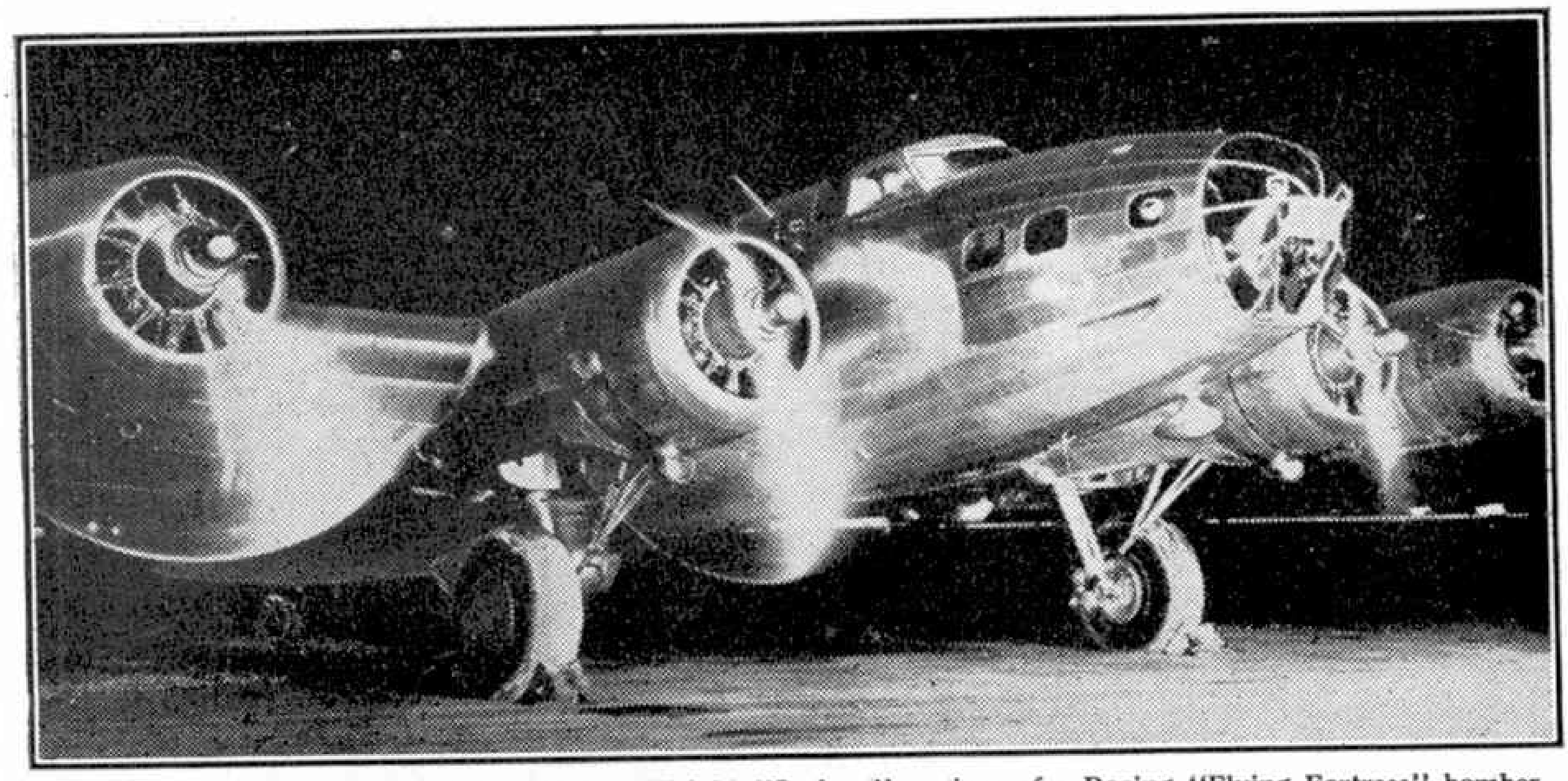
The Order of Lenin, the highest Soviet general award, has been given to four members of the R.A.F. Wing in Russia. This Wing has shot down 28 German aircraft.



Close-up of the port engine and undercarriage leg of a "Bristol" Beaufighter. Note the curved doors which close over the undercarriage unit when this is retracted. Photograph by courtesy of Bristol Aeroplane Co. Ltd.



One of the Douglas "Boston" twin-engined bombers in service with the Royal Air Force. Photograph by courtesy of Douglas Aircraft Company, Inc., U.S.A.



"Running in" the newly-installed 1,200 h.p. Wright "Cyclone" engines of a Boeing "Flying Fortress" bomber. The job is being done during the night shift, preparatory to flight testing the machine the next day. Photograph by courtesy of the Boeing Aircraft Company, U.S.A.

A Courageous "Whitley" Crew

The attention of all ranks in Bomber Command, R.A.F. has been drawn to the courage and devotion to duty of the captain and the wireless operator of a "Whitley" bomber which was recently detailed to attack Hamburg. In spite of very violent anti-aircraft fire the captain, a New Zealand Pilot Officer, continued to search for his particular target in the city, and as the bombs were being released a heavy shell burst alongside his machine. Both rudder controls were carried away, a wing tank was holed, and the wireless operator was wounded in two places. The captain kept control of the "Whitley" and set course for base, taking such evasive action as was possible without a rudder. He ran into very bad weather, and the machine was iced up in the clouds, but base was reached safely and a landing made on the flarepath.

Meanwhile the wireless operator had been suffering from his wounds. His left arm was useless, and his face became so swollen that his helmet had to be undone, and he took oxygen by putting the tube into his mouth. But he pluckily stuck to his duties, and kept his wireless log complete to the last detail, including his signature after landing.

* * * *

As Turkey is unable to obtain from Germany engines and spares for Heinkel aircraft, a supply of parts salvaged from German machines brought down by the R.A.F. has been sent from England.

The Trans-Canada Trophy

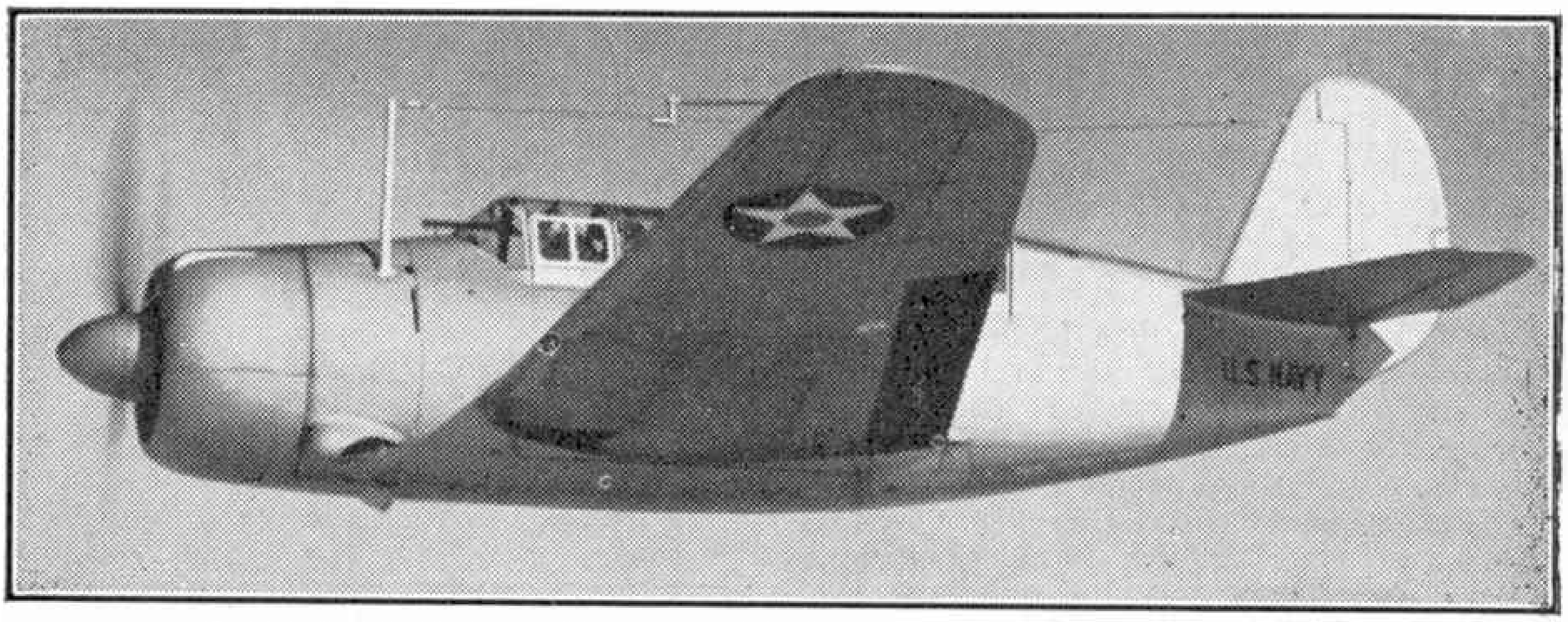
The Trans-Canada Trophy for 1940 has been awarded to Mr. T. W. Siers, Superintendent of Maintenance for Canadian Airways Ltd., for valuable technical work "in the face of great difficulties" in solving the problem of starting aero engines in Arctic Winter conditions. The company have lent Mr. Siers to the Canadian Government and he is in charge of aircraft overhauls for the Department of Munitions and Supply.

The Trans-Canada Trophy was given by the late J. D. McKee, of Pittsburgh, and has been awarded annually since 1927.

18,000 Miles Survey Flight

On 10th November last Pan American Airways' flying boat *"Capetown Clipper"* took off from New York on the first stage of an 18,200 miles survey flight to Leopoldville, in the Belgian Congo. There were 40 employees of the company and U.S. Civil Aeronautics Authority observers aboard, and the outward trip was completed in six days. The flying boat arrived back at La Guardia Airport on 26th November.

This survey flight was a preliminary to the starting of an air mail and passenger service between the United States and Leopoldville, by way of San Juan, Port of Spain, Natal, on the coast of Brazil, Bathurst, on the coast of West Africa, and Lagos, in Nigeria. The new service was officially begun from Miami on 6th December last, and at Lagos connection was made with the company's new service to Khartoum.



Curtiss SB2C-1 Dive-Bomber for the U.S. Navy making a high-altitude flight test.

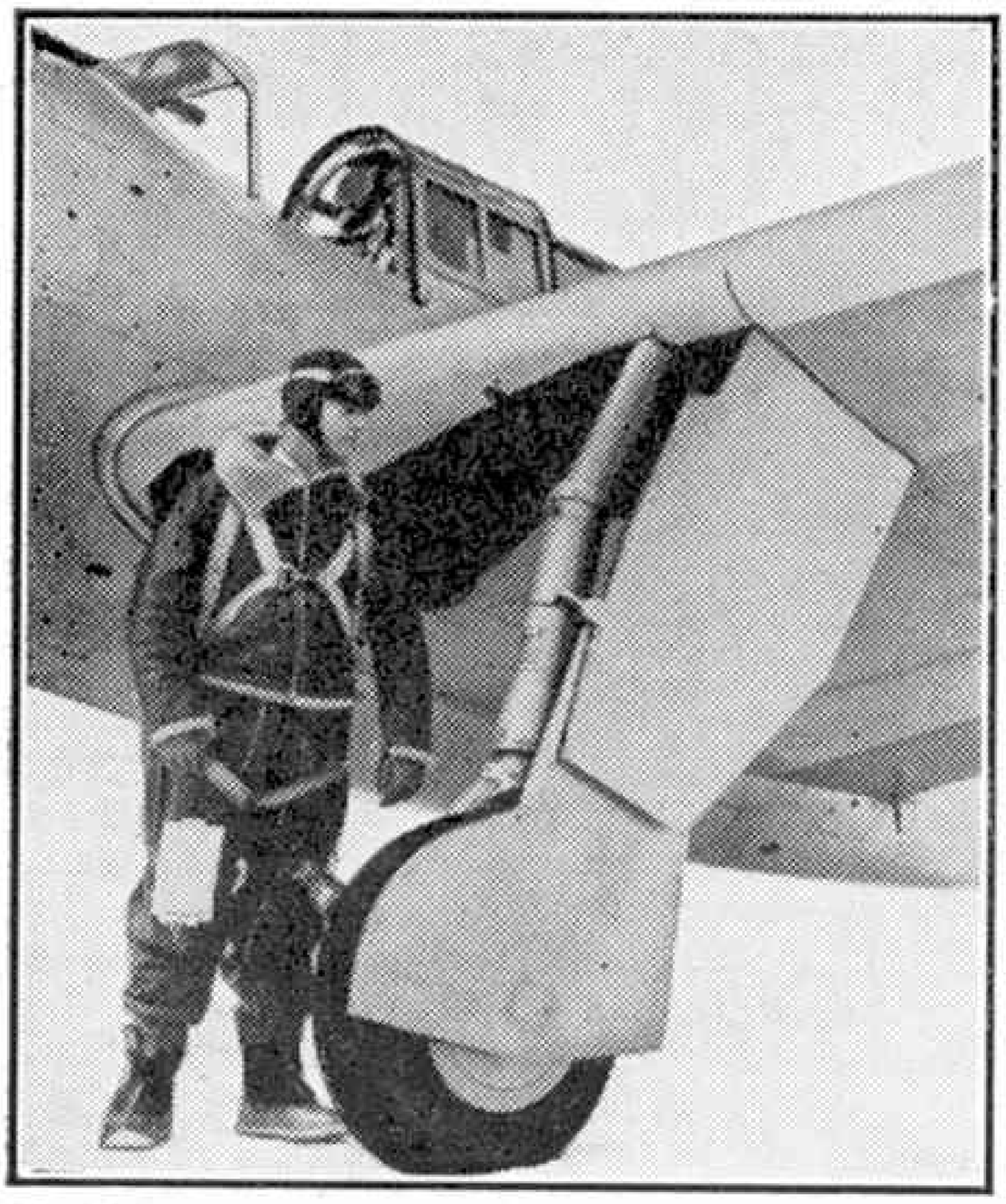
New Curtiss Dive-Bomber

THE United States Navy began experimenting in dive-bombing as long ago as 1924, and in 1928 the Curtiss company produced their first aeroplane built specially to fulfil the Navy's dive-bombing ambitions. Then in 1930 came the well-known Curtiss "Helldiver," and later, other successful bomber types, some of them for the U.S. Army Air Corps. Production of these 13 types, comprising 557 aircraft, gave the company a good knowledge of what is required in a dive-bomber.

About 1938 the United States Navy set makers of its aircraft a stiff task by calling for a "super" diving Scout Bomber capable of carrying double the bomb load 100 m.p.h. faster and twice as far as any machine of this type so far produced in that country. The much greater range was required to enable the new dive-bomber to protect the United States and its fleet 600 miles farther than previously, and to remain in flight 4½ hrs. longer than could the current Scout Bombers.

All the resources of the Curtiss-Wright engineering department and experimental shop were applied to the task of producing a machine that would comply with these requirements. The result is the Curtiss SB2C-1 dive-bomber illustrated on this page. It is designed to operate from aircraft carriers on extended scouting and bombing missions, and its 1,700 h.p. Wright "Cyclone" engine makes it the most powerful dive-bomber yet constructed in the United States. The engine drives one of the new 3-bladed Curtiss electric full-feathering airscrews.

The slotted wings fold upward to facilitate stowage in the aircraft carrier. A gyropilot and complete anti-icing equipment are provided to make long-range scouting missions under adverse operating more practical. The bomb load is carried inside the machine. No dimensions or performance details can be published.



Lloyd Child, Curtiss-Wright chief test pilot, inspecting the retractable landing gear of the new dive-bomber. Photographs by courtesy of Curtiss-Wright Corporation, U.S.A.

The Bluest Things Alive

World's Most Brilliant Butterflies

By L. Hugh Newman

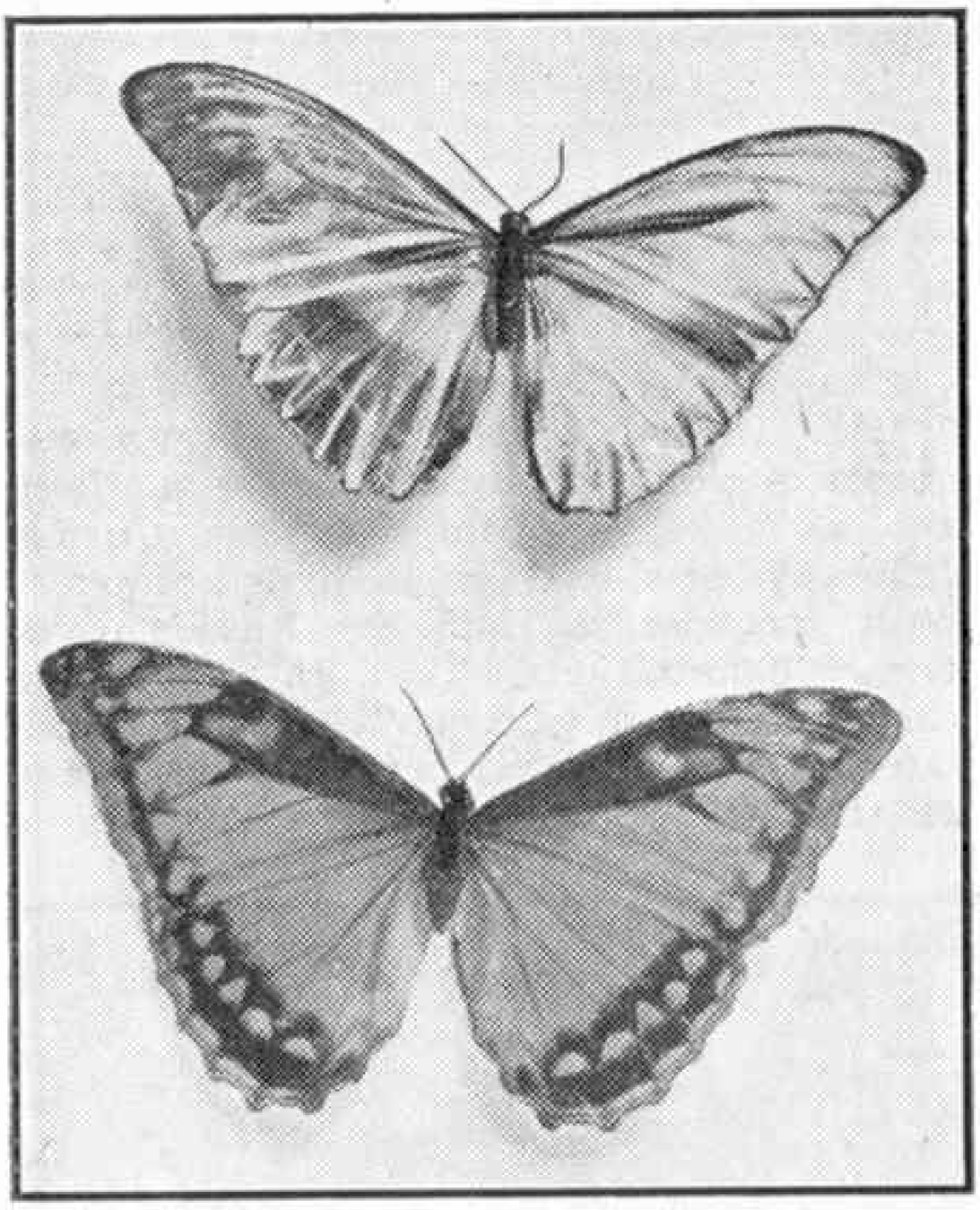
OUR British butterflies have vanished for the winter, but near the equator the world's most gorgeous insects are continually on the wing. Among them is the great and magnificent family of the Morphidae, which breeds in the tropical regions of the Western Hemisphere, in Central and South America, and on most of the West Indian Islands. This family of butterflies, the bluest things alive, is represented also in India, Lower Burma and China, throughout the Federated Malay States, and all over the East Indies.

Probably, as a family, the Morphos possess the most vivid colouring of all butterflies, but in most cases it is only the males that have the brilliant blue iridescence that is their characteristic. There is a more reliable scientific guide than colour by which these butterflies can be distinguished, however. Although some lack the brilliant colouring, all have the same typical rib formation on the lower wings. The ribs radiate more or less fan-wise from the body, and never cross or enclose any section of the wing.

Naturalists who have seen typical Morphos on the wing say they have a peculiar wavy flight, dipping up and down like switchback. They usually fly very high, so that their blue colouring is seldom seen, as the underwings are dark. Only when they dip low in a jungle riding or pathway are their shimmering wings to be seen, and the sight is worth waiting for! Yet this "colour" is an optical illusion, since the blue is not pigment, but only refracted light from the wing scales, which are minutely corrugated. It has been estimated that in the Brazilian forests and along the banks of the Amazon, males outnumber females by a thousand to one. This may be a gross exaggeration, but it is curious that so few females are ever seen in collections in this country or abroad.

One of the first questions most people ask me is how these beautiful butterflies are caught. It is obvious that you cannot tear about the jungle with a net in one hand and a killing bottle in the other, as the cartoonist likes to imagine all collectors do. Not only is the jungle where these insects breed too dense, but there are poisonous snakes to look out for.

A friend of mine once gave me a vivid description of what it is like during the "wet" season in South America in the forestland, where these butterflies always breed. Night after night electric storms seem literally to rock the earth, and peals



Morpho cypris, from Ecuador and West Coast of South America. The male, the upper one in our illustration, is one of the most vivid of all Morphos, but the female, shown below it, is pale biscuit in colour.

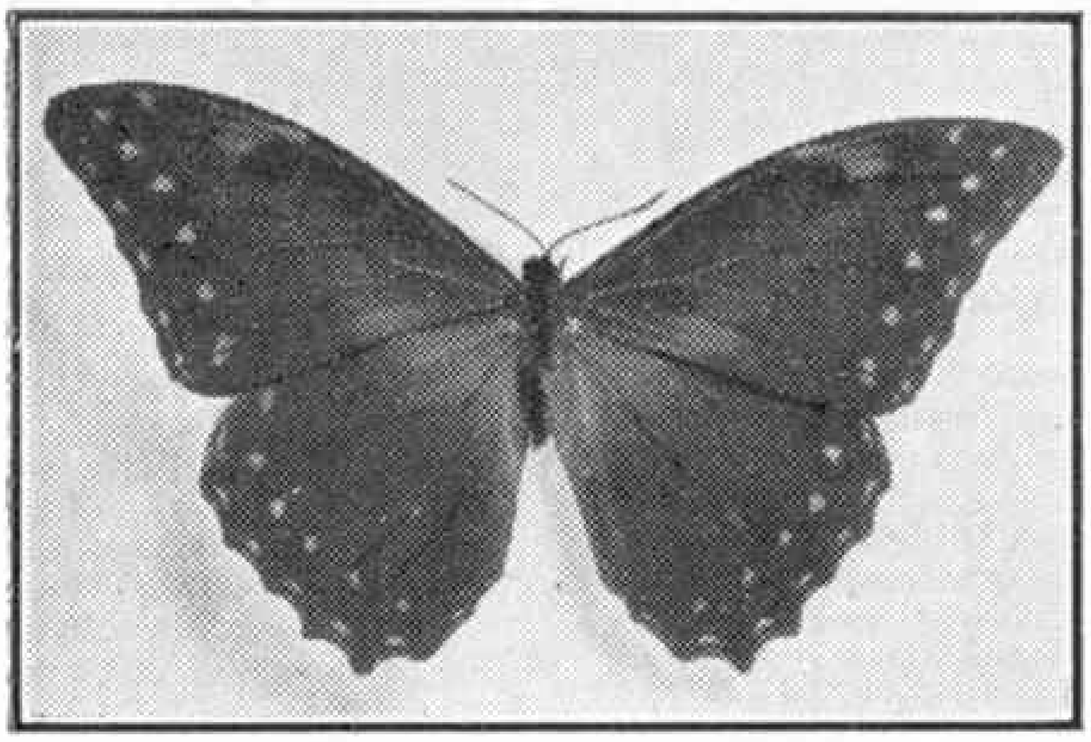
of thunder almost split the ear drums, terrifying animals and birds, which never seem to grow accustomed to it all. And when you think you cannot bear another moment of it, relief comes with the rain, which descends in a gushing torrent deadening all other sounds as it beats a tattoo on the canvas above your head. The downpour ceases as suddenly as it began. Dawn comes, and as the scorching tropical sun rises above the forest, the wreaths of misty vapour, hanging like enormous curtains round the tree trunks, vanish as though drawn aside by an invisible hand, and you have before you the perfect playground of the world's most beautiful butterflies. These are the conditions in which collectors of Morphos

must live and work, if they wish to add new prizes to their collections.

This friend of mine made an interesting discovery while collecting in Brazil a few years ago. He noticed that certain butterflies fluttered round a tree lizard conspicuous for the brilliant scarlet pouch on its throat. They paid for their curiosity with their lives, as the lizard snapped them up when they came near enough.

This gave my friend an idea that enabled him to add many rare specimens to his already large collection. He sent down to the coast from his headquarters for some brilliant cloth, and while he was waiting for the material to arrive he made clearings in the jungle where he had seen butterflies in great numbers flying round the tree-tops. When the cloth arrived he cut it into long strips and fixed the ends on to long poles. As soon as a native boy began to wave a coloured streamer above his head, some of the butterflies, attracted by what they no doubt thought was some gorgeous new nectar-filled flower, sailed gracefully down. My friend then slipped out from behind a low bush and, with a flick of the wrist to right and to left, he imprisoned two or three specimens in the folds of his wide "kite" net at the first attempt!

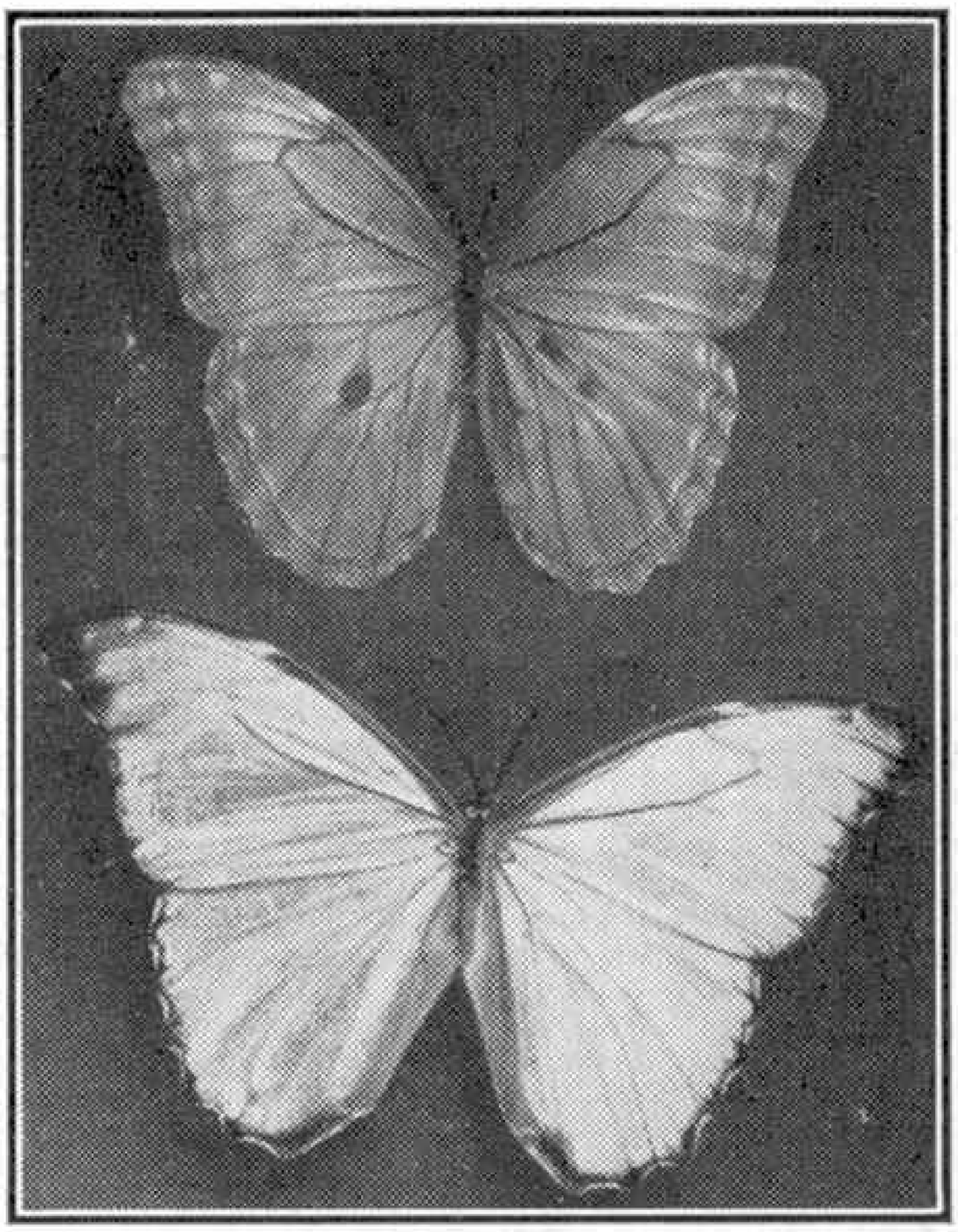
Nowadays a platform is built high up between the tree trunks, and natives, with nets fitted on to long sticks, sit all day in the broiling sun catching those that fly by. Another way, probably the best if you are a resident in the district and not merely a traveller passing by, is to get the natives to beat the trees on which the



Morpho hercules, from Central America, a brown butterfly that is an exception to the rule that Morphos are vivid blue in colour.

caterpillars feed, and breed the butterflies out in captivity in an ordinary breeding cage. In this way perfect cabinet specimens are obtained, also a small percentage of the females that are so elusive in the field.

When the craze for butterfly-wing



Morpho octavia, from Central America. The male, the lower in our illustration, has the appearance of mother of pearl, while the female, the upper one, is pale brown flushed with purple.

pictures and jewellery was at its height, soon after the last Great War, dealers in South America bought the Morphos by the million from missionaries and Government officials stationed in the districts where they were commonest.

There is at least one of the Morphidae occurring in India, which is so common in some parts of the country that it is considered a "pest." The caterpillars feed on the tea bush, and often whole plantations are defoliated, the larvae eating off the new shoots for the next year's growth, as well as ruining the current season's crop. The butterfly has no English name, but in Latin it is called "*Stichophthalma camadeva.*" It is a very large butterfly, beautifully patterned in deep chocolate brown on a pale violet blue background.

Many of the Morphos have been most romantically named after the heroes of Greek mythology, and so when you read or hear of butterflies with such names as hercules, adonis, menelaus, octavia, and archillae, you will know that in all probability their colour will be a magnificent blue. There are always exceptions to a rule, and the butterfly called hercules is an exception to this one, for even the male hercules is dull brown, flushed with deep olive green, a surprise for anyone who thinks he knows all about the Morphos!

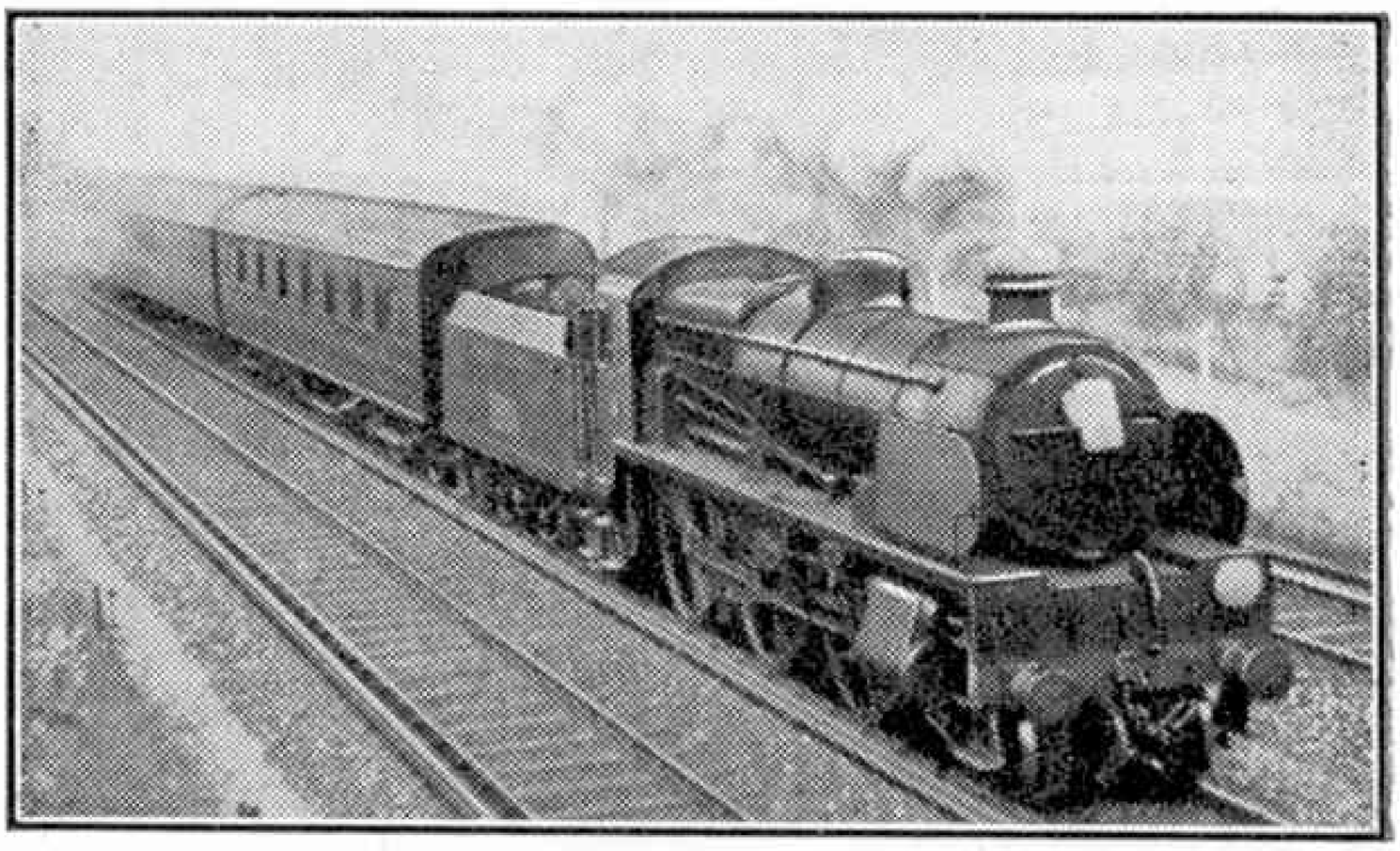
Railway News

Lively Running by Mixed Traffic Locomotives

Further wartime examples have recently come to notice of enterprising performance by modern three-cylinder mixed traffic locomotives working express passenger trains which require to make a number of stops.

The L.N.E.R. 2–6–2 "Green Arrows" of the "V2" Class are really big engines with a boiler pressure of 220 lb. per sq. in. and 6 ft. 2 in. driving wheels, and they appear capable of almost any speed or weight haulage. There are now over 120 in service, and one of them when working a relief train to Marylebone, G.C. section, regained over three min. during the run along the undulating 31¼ miles between Woodford and Aylesbury, which were covered in 35 min. 51 sec. start to stop with 310 tons. This included an engineering slack near Helmdon and the usual slowing past Grendon Underwood Junction, to which point the time was only 24 min. actual, or 23 net, for 22¼ miles. Spirited running was made up the 1 in 176 rises, while on the corresponding descents speeds of 75–80 m.p.h. were touched.

Among the Surrey hills on the cross country S.R. Eastern Section route from Reading, where the ups and downs are really formidable between Guildford and Redhill, the handling of the heavy through L.N.E.R. Newcastle-Banbury-Ashford services is the hardest daily proposition. One of the smaller and older "U1" class 2–6–0 engines displayed terrific vigour with a southbound train weighing well over 400 tons gross. Soon after leaving Guildford the 3½ miles up Chilworth bank at 1 in 100–96 brought speed down to a minimum of 20 m.p.h., and the shorter 1 in 96 after Gomshall to 26 m.p.h.; but so rapid was the acceleration on the short intervening descents that mile-a-minute speeds were twice attained, while there were many brake applications down the sharp fall to Dorking. On restarting from Deepdene (Dorking) a steady 30 was attained up the 1 in 125–116 to Betchworth, and the succeeding short dip produced 50 m.p.h., which rate was maintained well up the first part of a 1 in 141 climb towards Reigate. In two short start to stop stages of only 13 and 7¼ miles, 4½ and 2¼ minutes respectively were cut from schedule.



A Kent coast holiday express of the S.R., hauled by a three-cylinder 2-6-0 mixed traffic locomotive of Class "U1."

"The Boardwalk Flyer"

In Mr. R. A. H. Weight's article on the development of the Ivatt "Atlantics," in our April 1941 issue, mention was made of the early 4–4–2 engines of the Philadelphia and Reading Railroad, U.S.A., which gained fame over 40 years ago by operating daily runs between Camden and Atlantic City at an average speed of 66½ m.p.h., the train then being the fastest in the world. The distance was only 55½ miles and the time allowed 50 min. The train was run in connection with a ferry steamer from Philadelphia in competition with the seashore line of the Pennsylvania Company.

The express is still running and is known as "*The Boardwalk Flyer.*" The erstwhile competing routes have been merged into the Pennsylvania-Reading Seashore Lines and the Pennsylvania route is now followed. The present distance of 57.9 miles has to be covered in 52 min. both ways, thus requiring an average of 66.9 m.p.h., so that although by no means the quickest trains to-day they are decidedly fast. They are formed of ordinary steel stock and are still frequently hauled by an "Atlantic" of class E6s, a comparatively small type by modern U.S. standards.

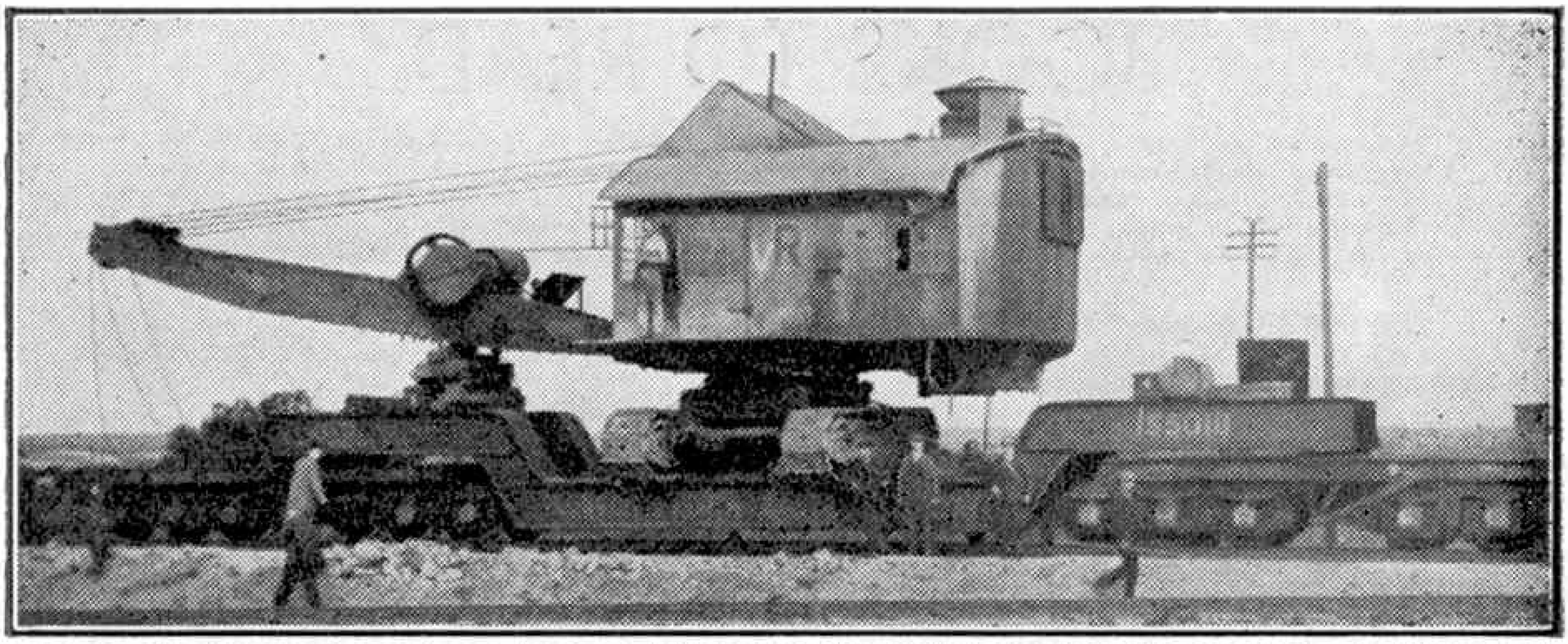
Two runs recently were behind No. 6086 eastbound and No. 6085 on the return trip, each of class E6s, with four cars, but so heavy were the vehicles that the load was 260 tons behind the tender. The eastbound journey was very fast in its later stages, as the 33 miles between Atco and Absecon were covered in 23 min. at an average of 86.1 m.p.h., with a maximum of 90. Despite a slack to 50 m.p.h. past a bridge reconstruction and an easy finish the arrival at the New Jersey seaside resort was 1½ min. early. The 7.10 a.m. back ran closely to schedule and made the trip in exactly the 52 min. allowed, but to achieve this it was necessary to cover many miles at around 78–80 m.p.h., the maximum touched being 88.

An Engine Running with Three Different Numbers

The "*Southern Railway Magazine*" records an amusing incident that occurred in 1934. Ex-L.B. & S.C. 4–4–0 No. 2049 having had its tender accidentally damaged was running for a few days with the tender off No. 2054, of the same class, which was in the shops for repair at the time. As the engine number appeared in large numerals on the tender it was thought that confusion would be avoided by pasting sheets of brown paper painted green over the figures "54" and writing the figures "49" on them. During the journey the two paper sheets on one side blew off, however, and that bearing the figure 9 from the other side suffered the same fate. The result was that the locomotive arrived at Bognor Regis bearing three different numbers, the correct 2049 on the buffer beam, 2044 on one side of the tender and 2054 on the other side.

Kent and East Sussex Railway Locomotives

Since the description of this small line was published in the November 1941 issue of the "*M.M.*" we have learned that only two K. and E.S.R. locomotives remain—Nos. 3 and 4. These are respectively the former Stroudley "Terrier," which was built in 1872 and was originally London, Brighton and South Coast Railway No. 70 "*Poplar*," and the erstwhile London and South Western "Saddleback" which dates from 1876. Both are 0–6–0 tank engines.



A 74-ton Diesel-engined navvy mounted on a 110-ton L.N.E.R. trolley wagon for transport by rail. Photograph by courtesy of the "London and North Eastern Railway Magazine."

A Load Well Out of Gauge

The upper illustration on this page shows a 74-ton Diesel-engined navvy while it was being transported on the L.N.E.R. recently. It was carried on a 110-ton wagon, and it then stood 22 ft. 6 in. above rail level, or 9 ft. 1 in. above the standard loading gauge. Its extreme width was 16 ft. 6 in., again vastly in excess of the standard gauge.

In order to load the navvy, which has caterpillar wheels 11 ft. 6 in. in length, it was run up a ramp built to the height of the wagon. It was carried 4 in. off centre, with its caterpillar tracks across the vehicle, the width of which was only 7 ft. 9 in. There were no overhead bridges on the route followed, but in addition to having both lines clear of traffic to give passage, it was necessary to lift or remove several groups of telephone wires and one signal. Other signal posts could only be passed by moving the navvy 4 in. while still on the wagon, making it 8 in. out of centre. The driver accomplished this easily, showing remarkable control over his gigantic machine.

Lancashire and Yorkshire 0-8-0 Engines

Many readers will be familiar with the sturdy 0-8-0 mineral locomotives built for the former L. & Y.R. between 1912 and 1920 as Classes "30" and "31." Although considerable scrapping took place during the years immediately prior to the present war, a number are still in service on the L.M.S. numbered between 127xx and 129xx. In their final form as Class "31," including rebuilds from Class "30," they are included in the L.M.S. "7F" power classification.

These engines have 4 ft. 6 in. driving wheels, large inside cylinders of 21 in. diameter and 26 in. stroke and boilers of considerable size with tubes of 1,482 sq. ft. heating surface, which with 552 sq. ft. superheater area and 195 sq. ft. of heating surface in the firebox provides a total combined heating surface of 2,229 sq. ft. The grate area is 25.6 sq. ft. The total weight of engine and tender in working order is 107½ tons. The eight-wheeled tenders as supplied to these eight-wheeled engines carried 5 tons of coal and 3,600 gall. water.

An Exceptional American Tank Engine Design

On the Boston and Albany Railroad of the U.S.A., which is controlled by the New York Central, are to be found five exceedingly large, heavy and powerful passenger tanks having the 4-6-6 wheel arrangement. They have been described as the heaviest tank engines in the world, though in reality they are almost tender locomotives, as the bunker carried on a six-wheeled bogie accommodates the whole of the water supply with a capacity of as much as 5,000 gallons. The space for over 5 tons of coal also suggests a full sized tender, judged by British standards. The driving wheels are 5 ft. 3 in. in diameter, and there are two outside 22½ in. cylinders having a stroke of 26 in.

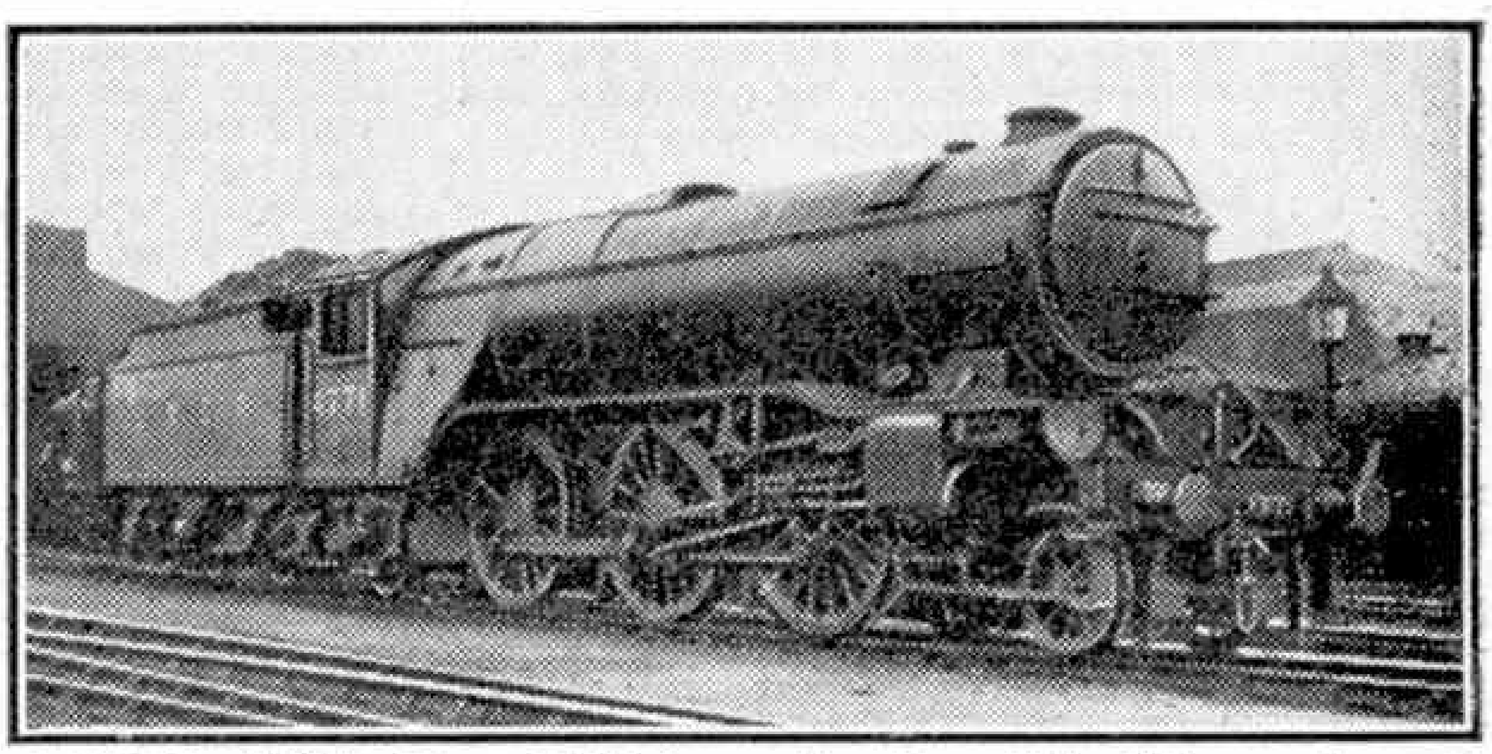
Tank engines are not numerous in the United States nowadays on account of electrification and also of the more general use of substantially sized tender locomotives for shunting and local work.

More Cross-Country Through Trains

Service and other travellers now require to make many cross-country journeys that would normally involve several changes at busy junctions. For their convenience now through L.N.E.R. services have been introduced between Colchester and Edinburgh, via Ipswich, Ely, Peterborough and the East Coast main line, and also between Colchester and Leeds, using the same route as far as Doncaster. These trains are in addition to the previously existing Colchester-Lincoln-York services, and they supplement those operated in conjunction with other companies between the North and South or West of England.

* * * *

The results of a census taken just before the outbreak of war showed that on any ordinary week-day an average of about 1,294,000 passengers passed through the 14 principal London main line stations, and 4,217 trains arrived at their platforms.



L.N.E.R. "V2" Class 2-6-2 locomotive No. 4771 "Green Arrow." These engines frequently haul express passenger or freight trains weighing up to 750 tons.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/- for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

Owing to difficulties that have arisen as the result of war conditions, it is impossible to guarantee the immediate delivery of books ordered in accordance with the scheme explained at the head of this page. For this reason readers who order books must be prepared for some delay, but every effort will be made to ensure speedy despatch.

"SCIENCE IN PEACE AND WAR"

By J. B. S. HALDANE, F.R.S.
(Scientific Book Club. Members only, 2/6)

Professor Haldane believes that in a time like the present we need science more than ever, and his book offers convincing proof of this. It consists of a series of articles contributed to the "*Daily Worker*." These form a splendid collection, ranging over the whole field of science, and written so that they can be easily understood.

The variety of topics is astonishing. From popular talk about the stars and atoms we pass on to facts about the brain and the glands of the body. Science in Russia is then dealt with, and we are shown how in that country there is interest in events rather than in things, so that scientific work there is full of life and of immense value for the future. Animals, public health, changes in climate, industrial health and the application of science in war are the topics of other articles, all of them written with an eye to everyday life. Thus the scientific aspect of speeding-up in factories is considered; the public health section includes facts about gas masks, food rations and vitamins; and the articles on science in wartime deal with explosives, barrage balloons and the possibility of the use of poisonous smokes by the Nazis.

Wherever one opens this book there is something of absorbing interest, and the reader cannot help acquiring some idea of the progress of modern science and of its vast possibilities. It is unfortunate that Professor Haldane cannot refrain from pushing forward, very unnecessarily, his own political views, but this in no way lowers the value of the book.

"THE RUNAWAYS"

(By CONOR O'BRIEN. Harrap. 5/- net)

This thrilling story begins off the coast of Southern Ireland, where two boys and a friend have the wild idea of sailing to Skye in a yacht. Adventures soon begin to rowd upon them. They weather storms and take on board a stowaway, whose presence leads to a clash with a gang of ruffians who have stolen secret plans. There is a thrilling climax in Skye, with exciting fights in the lochs and on the mountains, and a dash of hazardous rock-climbing thrown in.

"EVERYBODY'S MEDALS"

By S. C. JOHNSON, M.A., D.S.C.
(N.A.G. Press, 1/-)

Here we have the complete story of medals, ribbons, decorations and orders awarded to members of the fighting and defence forces. The story of medals is told from its vague beginnings hundreds of years ago, and the exact meanings of such terms as "medallion," "decoration," "order" and "bars" are fully explained. Then follow descriptions and illustrations of the ribbons, medals and decorations themselves, including those commemorating wars and campaigns as well as awards for distinguished service. How all these should be worn also is explained, and a fitting close is provided by an account of the Medal of Honour, the United States equivalent of our V.C.

"A CHILD'S DAY THROUGH THE AGES"

By DOROTHY MARGARET STUART
(Harrap. 7/6 net)

Miss Stuart's previous volumes on the lives of boys and girls through the Ages have become famous, and her latest production is sure to be as popular as they were. This time she gives us portraits of imaginary boys and girls, beginning with those of a Swiss Lake village of 3,500 B.C. and ending in London in the reign of Edward VII. Her 14 stories are simply written, but all are full of real facts that give us brilliant and convincing glimpses into the daily lives of likeable children of different Ages. Thus we spend a few hours with a girl of ancient Sumeria, with a boy in the Egypt of 3,600 years ago, and with representative families of Greece and Rome. Then we go north, to the home of the Vikings, after which we pass down through the Ages, seeing how boys and girls of different countries and classes have lived.

There are five full page pictures and 55 smaller ones in the text.

"TURNING AND SCREW CUTTING"

By W. F. WATSON and W. PITT
(Pitt's Popular Publications. 2/-)

This is a revised and enlarged edition of previous works on this topic by the authors, who speak from 35 years of lathe work. It is essentially practical, giving full directions for making adjustments and calculations, and for carrying on work accurately and smoothly. One section deals with turning, beginning with the lathe preparations and tool angles and clearances, and including a note on the machining of aluminium. All types of thread cutting, internal and external are then explained, and a general section gives hints on reading micrometers, and workshop details. The book is indeed an up-to-date manual, containing many useful tables and line drawings.

"THE AMATEUR RADIO HANDBOOK"

(Incorporated Radio Society. Price 3/6)

This excellent handbook was first published in 1938 for the benefit of radio experimenters in the British Isles. It immediately became very popular and a second edition has now become necessary. To-day copies are to be found in barrack rooms and ships' wireless cabins as well as amateur radio stations, and the book is accepted as an authoritative manual by many branches of the Forces.

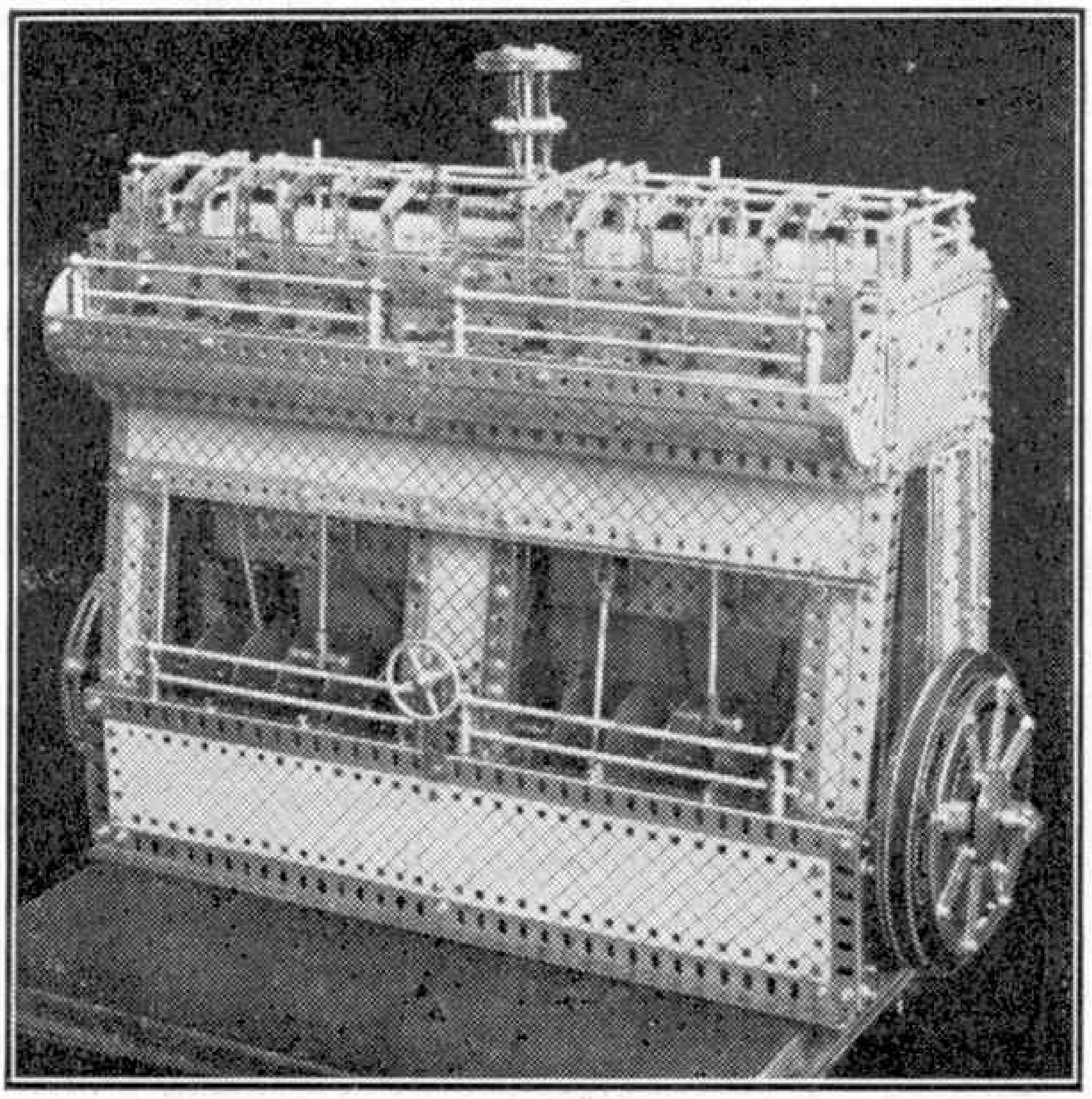
The secret of this popularity is the easy yet comprehensive manner in which the book is written. The Editor and his associates have wide practical knowledge of the needs of experimenters, and they make the approach to the problems dealt with easy by including extensive sections on electrical and radio principles. Workshop practice, radio valves, the construction of receivers and transmitters, and the planning and building of stations are among the many topics dealt with fully, in each case with a wealth of useful diagrams, and valuable suggestions are given for learning Morse and the use of codes. Useful tables and charts are included.

It should be noted that the overseas price of this handbook is 4/6.

Great "New Year" Model-Building Contest

Cheques and Postal Orders for Readers

To encourage Meccano boys to make the very best use of their Meccano parts, and so to obtain the greatest pleasure from model-building, we are offering a range of splendid prizes this month in a fine New Year Contest in which they can all enter. This is the time of the year when there are thousands of recruits to the Meccano hobby, and a special invitation to enter this contest therefore is extended to those newcomers. Many of them have already built the models shown in their Instructions Manuals, and now are keen to build others based on their own ideas. They will find that their model-building becomes even more exciting and interesting if they plan and construct an entry for this contest.



A fine model of a marine type Diesel engine, built by Mr. E. V. Hooke, Northolt.

Models of any kind whatsoever may be submitted. All Meccano structures are eligible, whether they are simple model cranes built with small Outfits, or huge locomotives, machines or giant bridges built from the largest ones. Every competitor will have the same chance, whatever the size of his Outfit, for the judges will take account of the Meccano parts at his disposal when assessing the value of his work.

Preparing an entry is very easy. It is not necessary to go to the trouble of sending the actual model. All that is required is a good drawing, or better still, a photograph, together with a written description of the principal features of the model. The competitor should write his age, name and address on the back of each photograph or drawing and these should then be posted to *"New Year General Model-building Competition," Meccano Ltd., Binns Road, Liverpool 13.* That is all there is to do.

Entries will be divided into two sections according to the ages of competitors. Those from readers of 14 years of age or more will be placed in Section A, and those from competitors under 14 will be grouped together in Section B.

The Contest will remain open for entries until 31st March.

The following prizes will be awarded in each Section of the Contest to the builders of the most interesting models received. First, Cheque for £2/2/–. Second and Third prizes will consist respectively of cheques for £1/1/– and 10/6. There will be also 5 further prizes each consisting of a Postal Order for 5/–. Certificates of Merit will be awarded to competitors whose models fall just short of prize-winning standard.

If they wish competitors may enter more than one model in the competition, but all entries from any single competitor must be sent under the same cover. No single competitor can win more than one prize; if he sends two or more models they will be considered jointly.

New Meccano Models

Wool-Winder and Clothes Washing Machine

CHIEF of the two new models we are describing this month is a useful wool-winding machine. This is shown in Fig. 1, and will be found not only interesting to construct but also useful when completed. The other new model is a clothes washing machine, the interior of which is fitted with rotating vanes for beating the clothes. It can be built from Outfit No. 3.

The first part of the wool-winder to be constructed is the frame. This consists of 12½", 5½" and 2½" Angle Girders bolted together to form a structure measuring 12½" × 5½" × 2½". Two 2½" Angle Girders are bolted to the sides of this frame, 1½" from one end, and two similar Girders 2 are bolted to the sides 5½" from the other end. The Girders form bearings for the Rods 3 and 4. Two 18½" Girders are bolted centrally across the top of the frame, 3½" apart. They form rails on which a trolley runs, and they are extended at one end by two 1½" Angle Girders overlapped one hole with the 18½" Girders.

Bearings for the Rods 5 and 6 are now added to the opposite ends of the rails. A 4½" Girder is bolted by its slotted flange to a 4½" Flat Girder, and a 2½" Semi-Circular Plate forms the top bearing for the Rod 6. The Semi-Circular Plate is strengthened by bolting a Crank to it. The lower bearing for Rod 6 is constructed in a similar manner. Two 7½" Angle Girders are held to the lower 12½" Angle Girder of the frame by Angle Brackets. Bearings for the Rod 5 consist of 2½" Angle Girders, and those for a Rod 7 are formed by two Double Brackets bolted to two 1" × ½" Angle Brackets, which are attached to a 5½" Girder fixed in the frame.

An E6 or E20B Electric Motor is bolted to two 5½" Strips attached to the sides of the frame. A ½" Pinion is fastened to the armature shaft of the Motor by its Grub Screw, and meshes with a 57-teeth Gear, carried on a 2½" Rod journalled in holes in the sideplates of the Motor. The 57-teeth Gear is spaced from the sideplates by a Collar on the 2½" Rod. The other end of this Rod carries a ½" Pinion that meshes with a 57-teeth Gear 8 on the 6½" Rod 4. On one end of this Rod is a Bush Wheel, and on the other end a 1" Sprocket Wheel, which is spaced from its bearing by a Collar.

The Rod 3 carries at one end a Crank, and in the centre a ⅞" Bevel Gear and a Coupling between two Collars. Meshing with the Bevel Gear is a similar gear mounted on the Rod 7, one end of which is journalled in the Coupling and the other in the two Double Brackets. The Rod is prevented from sliding in its bearings by a Collar, and carries at its upper end a Bush Wheel. The skein of wool is placed over two Sleeve Pieces carried at the ends of a 12½" Strip bolted across the Bush Wheel. A Crank is fixed to each end of the Strip. Each projecting half of the 12½" Strip is fitted with a Sleeve Piece that is held to the Strip by a Chimney Adaptor and two ½" fast Pulleys fixed to a 2" Rod. The lower end of this Rod is gripped in the boss of the Crank by its Grub Screw.

The Crank on the Rod 3 is connected to the Bush Wheel on the Rod 4 by a compound 6½" Strip 9, which is constructed by overlapping a 4½" Strip and a 3½" Strip and bolting them together. The compound 6½" Strip is lock-nutted to the Crank and to the Bush Wheel.

The 1" Sprocket Wheel on Rod 4 is connected by Sprocket Chain to another 1" Sprocket Wheel on Rod 5, the other end of which carries a ⅞" Bevel Gear that meshes with a similar gear fixed on Rod 6. The latter Rod also carries a Coupling, in the bore of which is journalled one end of Rod 5. The upper end of Rod 6 carries a Crank to which is bolted a 7½" Strip, the other end of the Strip being bolted to a second Crank as shown. The boss of this Crank carries a 1" Rod, on which pivots one end of a 9½" Strip. The other end of this Strip is lock-nutted to a 5½" × 2½" Flanged Plate that forms the base of the trolley. Two Trunnions are bolted to the Flanged Plate and to them 2" Strips are attached. A 2" Rod is journalled in holes in these Strips and on it is pivoted a compound 6½" Strip 10, which is attached to the Rod by means of a 1½" × ½" Double Angle Strip.

Guides for the wool consist of a Coupling 11 and a Collar 12 fixed to the 6½" Strip. The latter is prevented from dropping below a pre-determined level by a 2½" × ½" Double Angle Strip bolted to the Flanged Plate, and is tensioned by a Driving Band fixed to the Strip and to the 2½" × ½" Double Angle Strip. The arm is given an up and down motion by means of a wheel 13, which consists of four ¾" Discs fixed to a 1" × 1" Angle Bracket bolted to the arm. The wheel runs along the underside of a 7½" Strip 14, which is slightly curved and is fixed to the base by two 4½" and two 2½" Angle Girders.

The mechanism should be adjusted so that when the Motor is set in motion, the Coupling on the

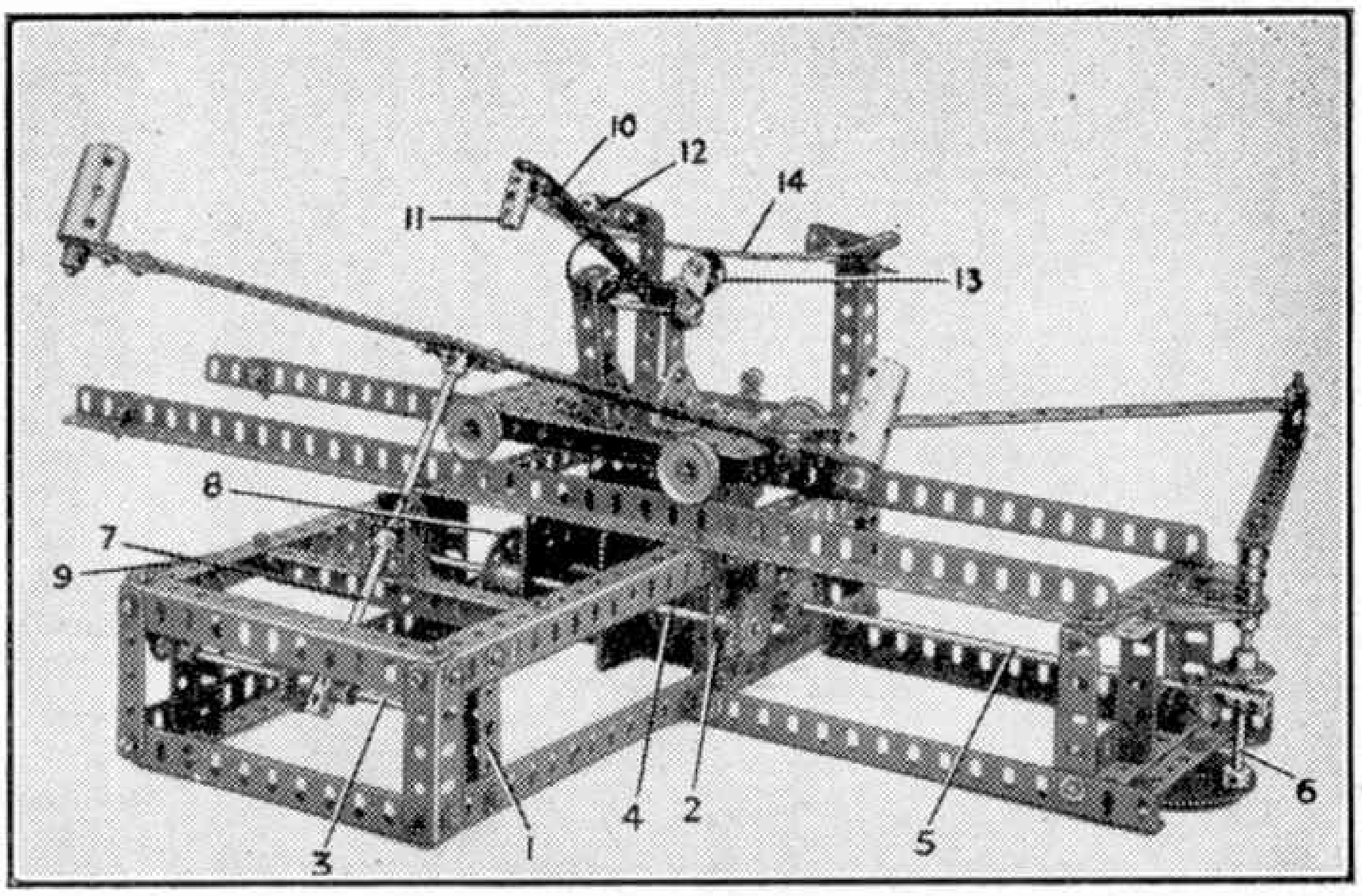


Fig. 1. A useful wool-winding machine that is interesting to construct and operate.

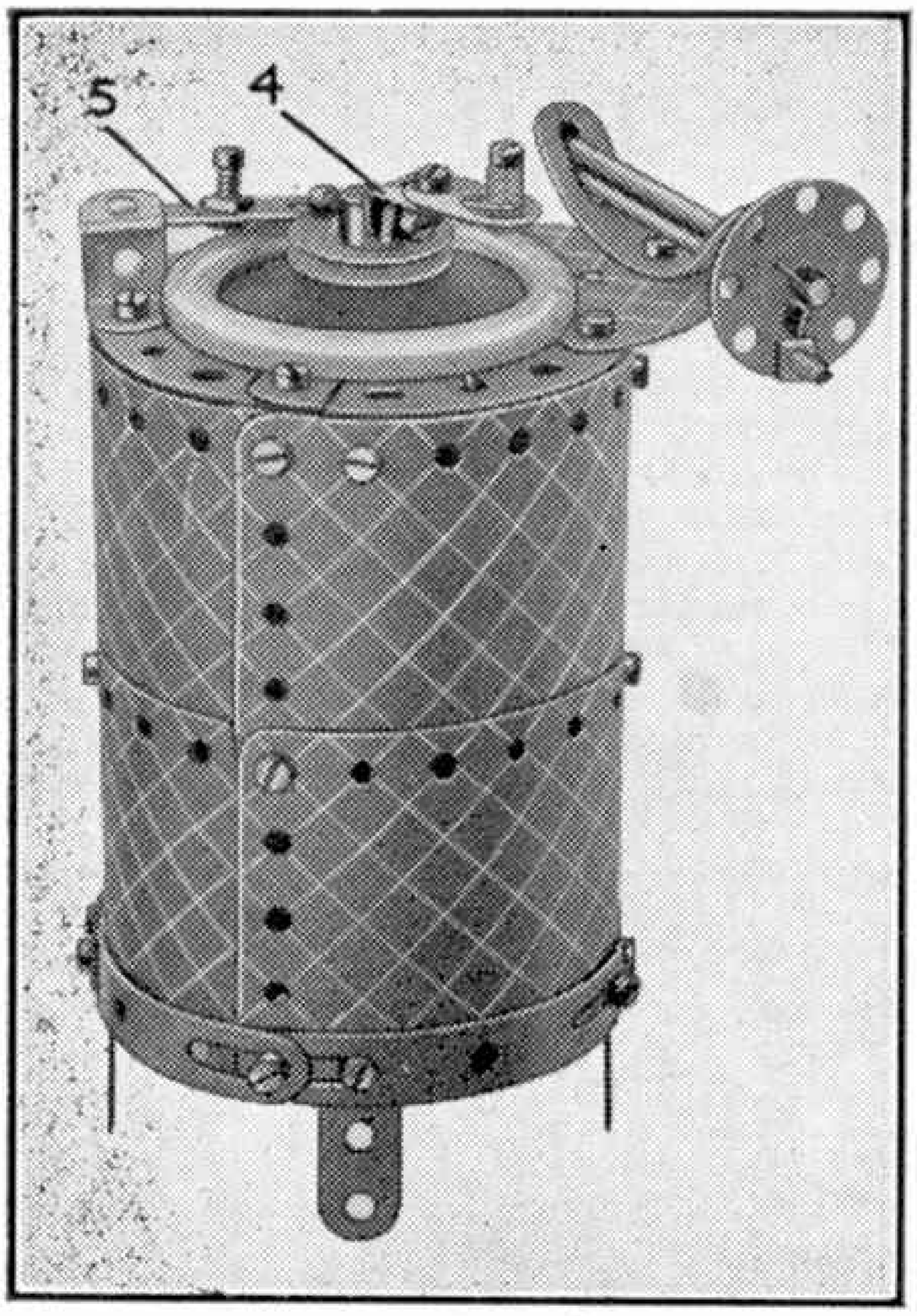


Fig. 2. A simple model clothes washing machine.

pivoted 6½" Strip describes a figure eight around the two arms that carry the wool.

Parts required to build Wool Winder: 1 of No. 1; 1 of No. 1a; 2 of No. 1b; 3 of No. 2; 2 of No. 2a; 1 of No. 4; 1 of No. 5; 2 of No. 6; 2 of No. 7a; 4 of No. 8; 2 of No. 8b; 5 of No. 9; 4 of No. 9a; 14 of No. 9d; 2 of No. 9f; 2 of No. 11; 4 of No. 12; 1 of No. 12a; 1 of No. 13a; 2 of No. 14; 1 of No. 15; 5 of No. 16b; 1 of No. 16a; 3 of No. 17; 1 of No. 18b; 4 of No. 22; 4 of No. 23a; 2 of No. 24; 2 of No. 26; 2 of No. 27a; 4 of No. 30; 118 of No. 37a; 114 of No. 37b; 83 of No. 38; 1 of No. 48a; 1 of No. 52; 15 of No. 59; 6 of No. 62; 3 of No. 63; 1 of No. 94; 2 of No. 96; 2 of No. 103c; 4 of No. 111; 1 of No. 111c; 2 of No. 126; 1 of No. 126a; 2 of No. 163; 2 of No. 167. 1 Electric Motor E6 or E20B.

Readers in search of a novel model that is easy to build and requires only a small variety of parts for its construction, will find the washing machine shown in Fig. 2 a good subject for their attention. This is based on a modern type of domestic device consisting of a metal boiler, in which the water is heated by gas. Operating inside the boiler is a set of vanes, which are rotated by turning a handle mounted on top of it. These agitate the water and beat the clothes, thus giving them a thorough washing. In the illustration the model is shown for hand operation, but model-builders who have either a Clockwork or an Electric Motor will have no difficulty in arranging the model for driving by one of these units.

The boiler of the washing machine consists of three 2½" Cranked Curved Strips that are bolted together to form part of a circle, the ends of the arc being attached to a Semi-Circular Plate. Three 5½" Strips are fixed to the Curved Strips by ½"×½" Angle Brackets, and they are encased by two 5½"×2½" and two 4½"×2½" Flexible Plates, but project at their lower ends to form legs. These Flexible Plates are joined to a 2½"×2½" and a 2½"×1½" Flexible Plate so that a space is left in the bottom of the boiler to allow access to the burner. Three 3" Formed Slotted Strips and a 2½" Strip bent to the required shape are bolted to the lower ends of the Flexible Plates. Two 5½" Strips are attached to the boiler to provide further legs for the machine.

Inside the boiler are rotating vanes that beat the clothes. They consist of Double Brackets bolted to a 2½" Strip. This Strip is fixed to a ½"×½" Angle Bracket lock-nutted to the boss of a 1" Pulley. The latter is mounted on a 3½" Rod 1 journalled in a Flat Bracket and a Reversed Angle Bracket bolted to Trunnions attached to the arms of a 2½"×½" Double Angle Strip fixed to the boiler plates. The upper end of the Rod carries a Bush Wheel, in which are two Bolts fixed with their shanks upwards. These Bolts engage a ½"×½" Angle Bracket 2 attached to the boss of a 1" Pulley mounted on a 1½" Rod 3, to which is also attached the operating handle.

A bearing for Rod 3 is provided by the boss of a Road Wheel, which also forms the cover of the boiler. The handle is a ½"×½" Angle Bracket 4 fixed to the boss of a 1" Pulley and attached to a Flat Bracket. A Cord Anchoring Spring is fixed to the outer end of this Flat Bracket by a ⅜" Bolt.

A clip consisting of a 2½" Strip 5 lock-nutted to the top of the boiler in the position shown, is provided to hold the cover in place when the machine is in operation. This Strip fits over one side of the cover and is held against it by a ½" Reversed Angle Bracket also bolted to the boiler top. The bottom of the boiler is a 2½"×2½" Flat Plate attached to a 2½" Cranked Curved Strip fixed to the model by ½"×½" Angle Brackets.

The model is completed by incorporating a wringer. This consists of a 3½" and a 2" Rod held in the slots of a 3" Formed Slotted Strip bolted to the boiler top. A 1¼" Disc fitted with a ⅜" Bolt is fixed on the 3½" Rod between two Spring Clips, and is held in contact with the 2" Rod by a 2½" Driving Band, which is passed over both ends of the Rod and attached to the Semi-Circular Plate.

Parts required to build model Washing Machine: 5 of No. 2; 3 of No. 5; 2 of No. 10; 2 of No. 11; 8 of No. 12; 2 of No. 16; 1 of No. 17; 1 of No. 18a; 3 of No. 22; 1 of No. 23; 1 of No. 24; 5 of No. 35; 51 of No. 37a; 44 of No. 37b; 5 of No. 38; 1 of No. 40; 1 of No. 48a; 4 of No. 90a; 4 of No. 111c; 2 of No. 125; 2 of No. 126a; 1 of No. 176; 1 of No. 186; 1 of No. 187; 1 of No. 188; 2 of No. 190; 2 of No. 191; 2 of No. 192; 1 of No. 214; 4 of No. 215; 2 of No. 217a.

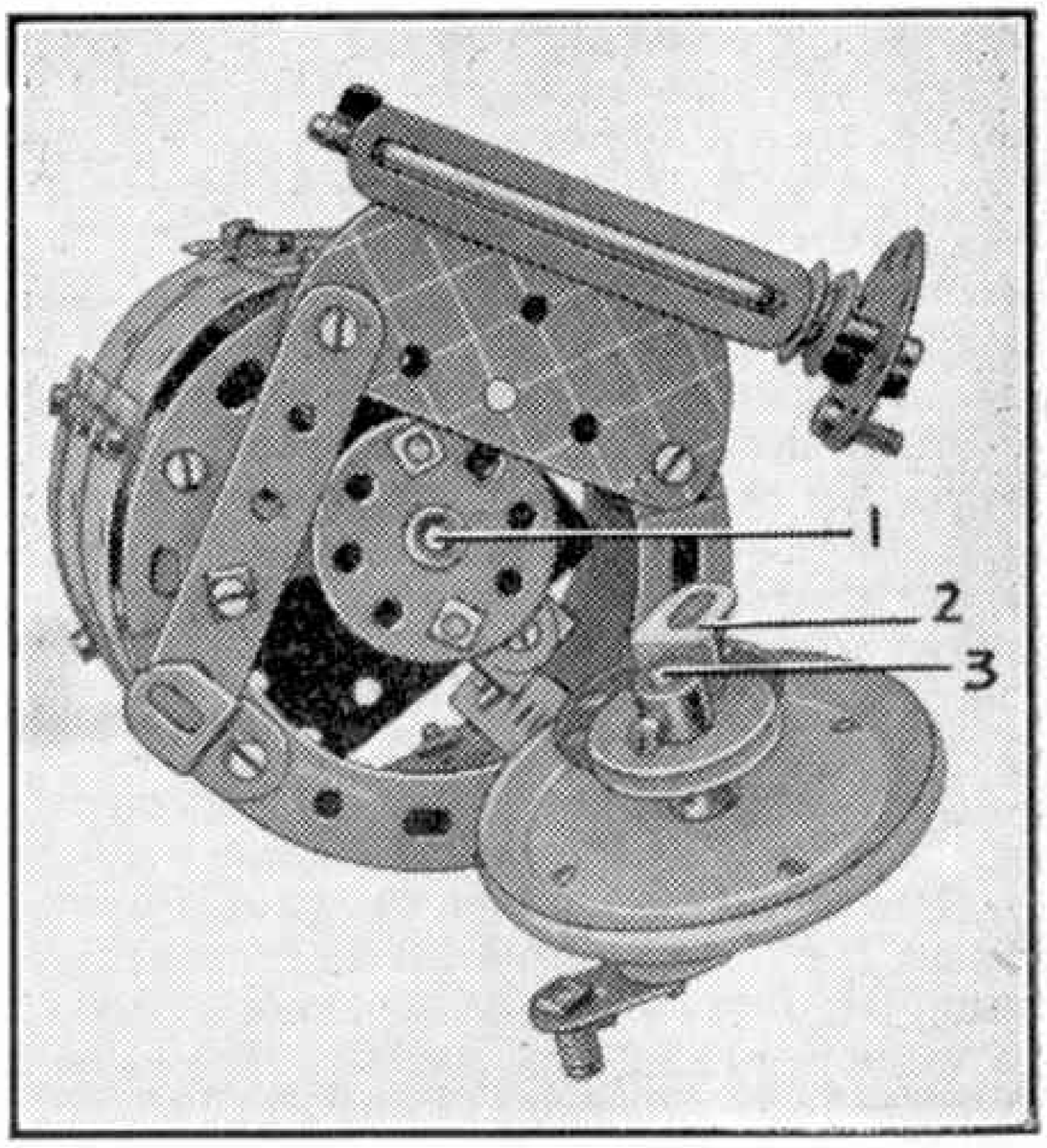


Fig. 3. View of the inside of the washing machine shown in Fig. 2.

Suggestions Section

By "Spanner"

(533) The Constantinesco Torque Converter

("Spanner")

Fig. 533 shows a Meccano model of the Constantinesco Torque Converter, an infinitely variable speed mechanism for use in motor cars that obviates the use of a gear-box and clutch. The device also allows the maximum efficiency to be obtained from the engine to which it is fitted, since it transmits the power almost directly to the road wheels.

The Meccano model is built up as follows. A 2½" Strip 7, which is weighted with a 1" Gear 8, is bolted to an Eccentric 9. The latter is mounted on the driving shaft 10 and imparts oscillatory movement to the Strip 7. Two 4½" Strips 5 are pivoted by a Bolt and lock-nuts 6 to the 2½" Strip, their other ends being connected to short Rods, which are mounted in Couplings 11 and carry Pawls 3. The Couplings 11 are attached by 1" Rods to further Couplings, which are free to move about the Rod 1. The Pawls are opposed to one another, and engage a Ratchet Wheel 2 mounted on the driven shaft. Pieces of Spring Cord 4 exert a slight pressure on the Pawls to ensure their proper engagement with the Ratchet Wheels intermittently, one rotating it when the Strips 5 are moved forward while the other is brought into operation on the reverse stroke of the Strips. The combined effort of both produces a constant rotary motion of the shaft 1.

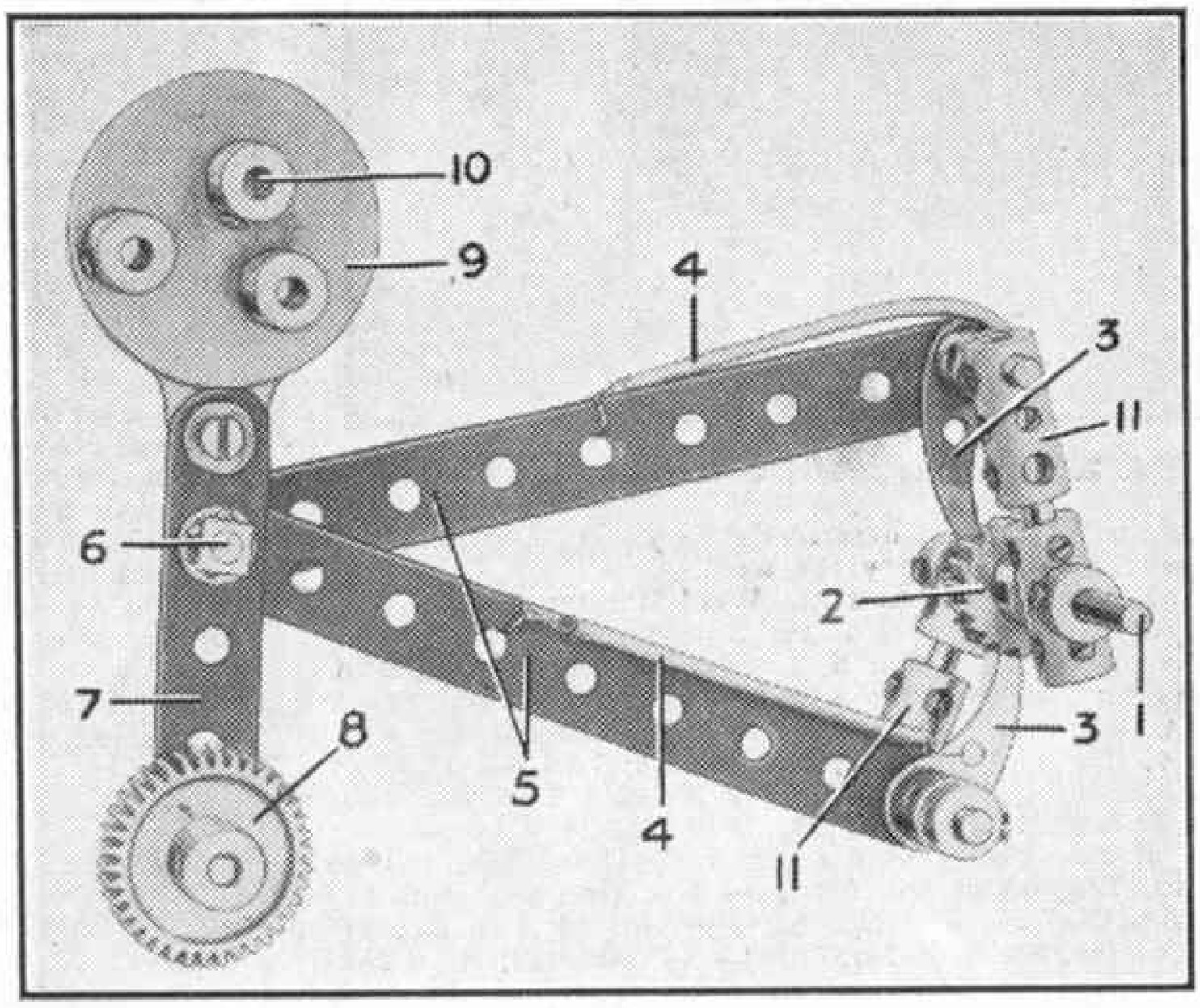


Fig. 533.

(534) A Unique Measuring Instrument

(R. A. Fairthorne, Farnborough)

The interesting device shown in Fig. 534 is an instrument designed to measure the angular movement of a shaft with an accuracy of 1/60th degree. It is constructed as follows. Two 3"×1½" Flat Plates forming the bearings for the gear shafts are bolted to 3" Angle Girders that are firmly fixed by 1½" Corner Brackets to similar Girders forming the base of the instrument.

The driving Rod 1 is 4" long and carries a 57-teeth Gear 2, by means of which this Rod and a 3½" Rod 3 are rotated, the latter through a ½" Pinion and another 57-teeth Gear mounted on it. A Worm fixed on the Rod 3 meshes with a ½" Pinion on a vertical 3" Rod that also carries a Worm. This Worm engages a ½" Pinion 4 that is loose on the Rod 1, but is attached by means of a Socket Coupling to a Face Plate bearing a scale graduated in 6° divisions. A Pointer 5 is fixed on Rod 1 close to the scale to facilitate rotating the Rod through a definite number of degrees.

The Pinion 4 engages a similar Pinion on the driven Rod, which carries also a 2" Pulley. A reinforced bearing for this Rod is provided by a Crank. A 6" Driving Band passed around the 2" Pulley and a 1" Pulley fixed to the lower end of the Flat Plate by a ¾" Bolt, provides a retarding brake for eliminating error that may arise from slight play in the teeth of the Gears and Pinions. A fixed point against which the rotating scale can be read consists of a Pointer bent as shown and

attached by a ½″ Bolt to a ½″ Reversed Angle Bracket fixed to the frame. The angular movement of a shaft is measured by coupling it to a Coupling 6 mounted on the end of the driven Rod.

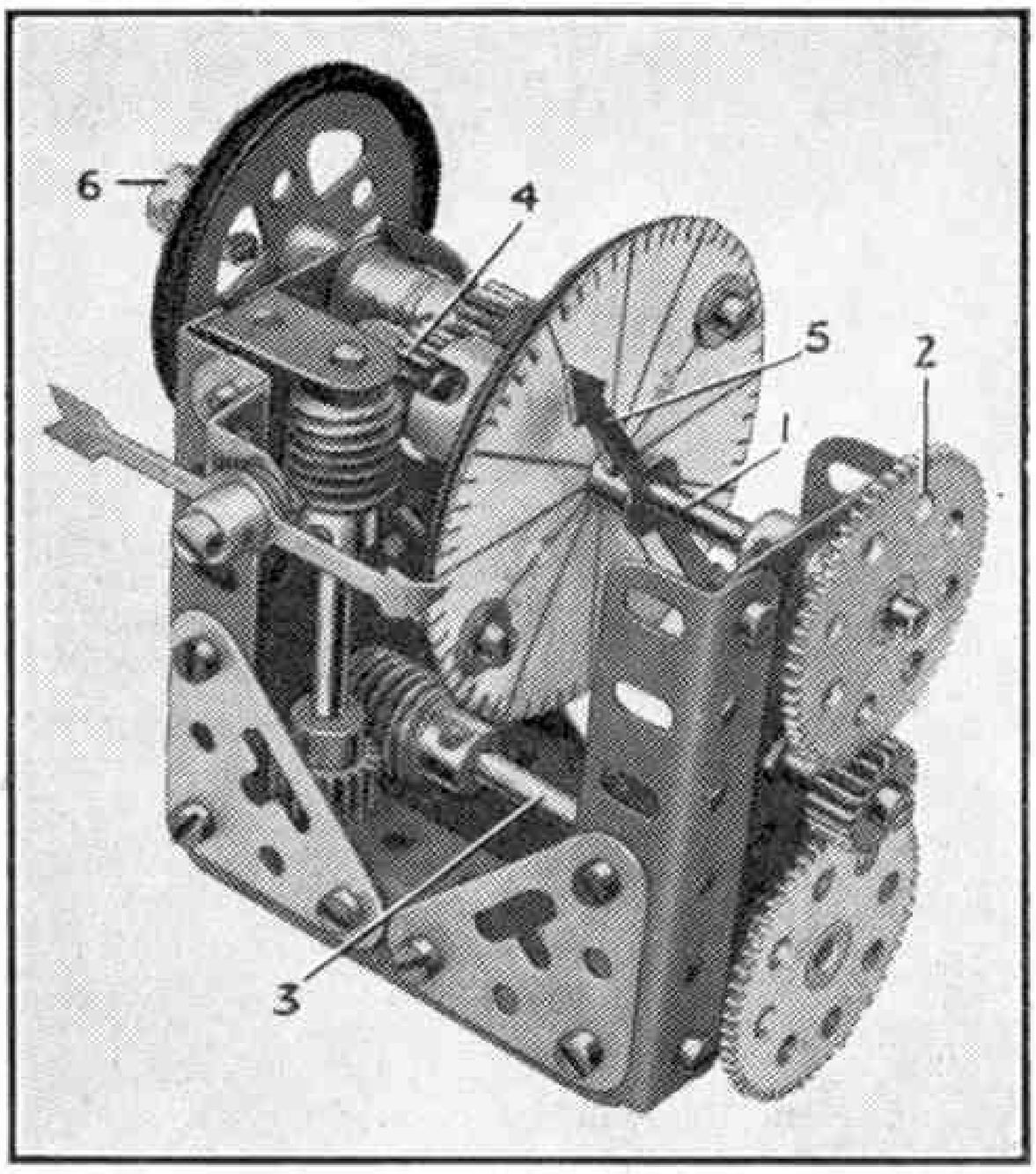


Fig. 534.

(535) Automatic Gear-Change
("Spanner")

In Fig. 535 is illustrated a special gear-box which, if called upon to withstand a sudden increase of load on the driven shaft, automatically changes over from high gear into low.

The driving shaft of the mechanism is in two sections, 1a and 1b, and is connected to the Motor by means of Sprocket Chain or other suitable method. The countershaft 3 is connected in any convenient manner to the mechanism that is required to be set in motion. The 3″ Rod 1a carries a Bush Wheel 4, which is coupled by two pieces of cord 6 to a second Bush Wheel 5. The latter is free to ride up or down the shaft 1a.

Two 1½″ Double Angle Strips secure the Bush Wheel 5 to a 57-teeth Gear 7 mounted on the end of the 3″ Rod 1b. This Rod carries a 1″ Gear 8 and a Compression Spring 9. The Spring tends to maintain the cords 6 outstretched as shown in the illustration, and in this position the Gear 7 is in engagement with a ½″ Pinion 11 on the countershaft 3. This gives a speed ratio of 3 : 1.

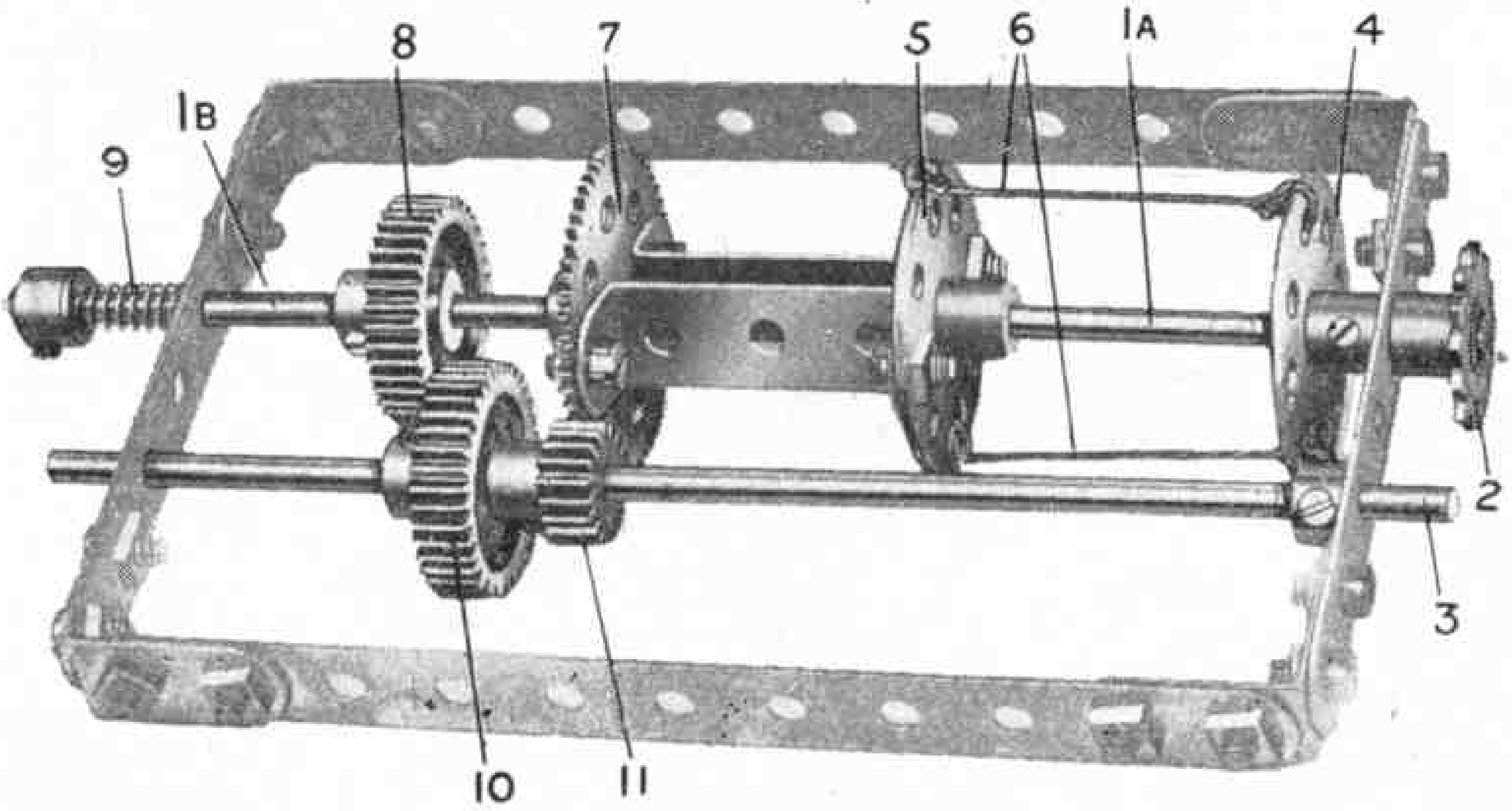


Fig. 535.

The Gear 7 will continue to drive the Rod 3 considerably faster than the driving shaft so long as the load or resistance on that Rod remains light, but if the load is increased suddenly the shaft 1a and Bush Wheel 4 commence to revolve faster than the Bush Wheel 5. When this takes place the cords 6 are twisted slightly, with the result that the wheel 5, sliding on the Rod 1a, is drawn nearer to the wheel 4. This movement throws the Gear 7 out of engagement with the Pinion 11 and causes the Gear 8 to mesh with a similar Gear 10 on the countershaft 3, thus producing a low speed gear having a 1 : 1 ratio. To bring this about, however, the Spring 9 must be compressed, and so the two 1″ Gears will remain in engagement only so long as the load on the shaft 3 is greater than the pressure on the Spring.

Immediately the load drops below a certain level the Spring re-asserts its influence over the cords 6 and the gear is returned to its normal or "top" speed position.

Club and Branch News

WITH THE SECRETARY

NEW YEAR GREETINGS

This month I have the great pleasure of wishing a happy New Year to all Guild and H.R.C. members everywhere. I have to thank the many, from all parts of the world, who have sent me greetings for 1942, and I join with them in the wish that the coming year will be one of the best for all of us. In particular I hope that it will see us well on the way to final victory in our struggle against aggression.

PROSPECTS FOR 1942

Things have been difficult during 1941, and I have been greatly impressed by the spirit displayed throughout, especially in Clubs and Branches in places that have suffered damage in air raids. I have given many instances of this spirit, from London, Plymouth, and other cities in Great Britain, and I can now add another example of unusual interest in the Lasallian M.C. Malta, the home of this splendid Club, has been raided on innumerable occasions since the entry of Italy into the war, and the attacks have been met as courageously as those on this country. Throughout the Lasallian Club has continued its meetings, which have been attended regularly in spite of frequent raids, and even damage by bombs to the Club's premises has failed to deter members, who have continued their meetings in emergency premises.

I am sure that 1942 will have better things in store. Clubs and Branches will continue to meet, although war conditions may restrict their activities, and so they will carry on with the good work of helping to make boys and young men mechanically minded, a great national asset in these days of mechanical warfare. A special word of praise must be accorded to Leaders, Chairmen and senior members, many of whom spend long hours in war work, supplemented by nights spent in carrying out the duties of Wardens and Fire Watchers, and yet find time to devote to the affairs of the Clubs and Branches with which they are associated. Younger members too have many calls on their time, but they are steadily supporting their seniors, and with this spirit prevailing there is no doubt that 1942 will prove even more successful than 1941, whatever the trials in store for us.

Every enthusiast should join a Club or a Branch, and if there isn't one within his reach he should try to form one. If all try we should be able to make a record in 1942 for the number of new organisations.

MERIT MEDALLION NOMINATIONS

I wish to call the special attention of Leaders to the necessity for letting me have nominations for Merit Medallions, so that I can complete my list of these awards for publication in an early issue of the "*M.M.*" In each Club two of these Medallions are available in each Session, and they are awarded for good work of any kind whatever. This may be special activity within the Club, or even outside the ordinary run of Club work, so long as it leads to an improvement in the programme or brings distinction to the organisation. All nominations for the last session of 1941 should be sent to me immediately.

George Longworth is the mascot of the Rochdale Branch, No. 417, Chairman, Mr. D. R. Morgan, secretary, A. Morgan. This Branch was only incorporated in August 1941, but members have developed a fine layout and enjoy interesting operations. Visits also are made to centres of railway interest.

BRANCHES RECENTLY INCORPORATED

418. MACCLESFIELD—Mr. J. D. M. Hunt, Beech Hall, Macclesfield.
419. JARROW-ON-TYNE — Mr. P. Wilson, 38, Dene Terrace, Monckton, Jarrow-on-Tyne.
420. LEEDS—Mr. F. C. Simons, 114, Talbot Road, Leeds 8.
421. COATHAM SCHOOL—Mr. B. J. Rushby-Smith, Coatham School, Redcar.

Club Notes

EXETER M.C.—Enthusiasm is at its highest pitch, and remarkable attendance records are being made. Great activity is being shown in model-building. The large model of Ladysmith School is now complete. A special feature is the incorporation of lift arrangements, in planning which great ingenuity was shown. Football also has occupied the attention of members, and all teams enjoy their games thoroughly, win or lose. Club roll: 120. *Secretary:* K. Addicott, 46, Ladysmith Road, Exeter, Devon.

THE LEAS SCHOOL (HOYLAKE) M.C.—In its wartime quarters this Club has been very active. Members are using their outfits to great advantage in model-building and the Club Library is very busy. Mr. J. F. G. Bigland, Leader, arranges specially interesting Lectures, which are illustrated by means of the epidiascope. Recent topics have included "*The Production of Rubber*," "*Locomotives Old and New*" and "*Photography*." A very good Lecture on "*Fireworks*" was given on 5th November. Club roll: 59. *Secretary:* M. P. Warburton, The Leas, Ullswater.

BLUNDELLSANDS M.C.—Meetings in the Clubroom are still impossible, but members assembled at the home of one of them for a very enjoyable meeting, at which home-made wireless sets were demonstrated

and thoroughly examined. Other meetings have been arranged and every effort is being made to restart activities on a larger scale. Club roll: 39. *Secretary:* J. K. Noel, 27, Lancaster Avenue, Liverpool 23.

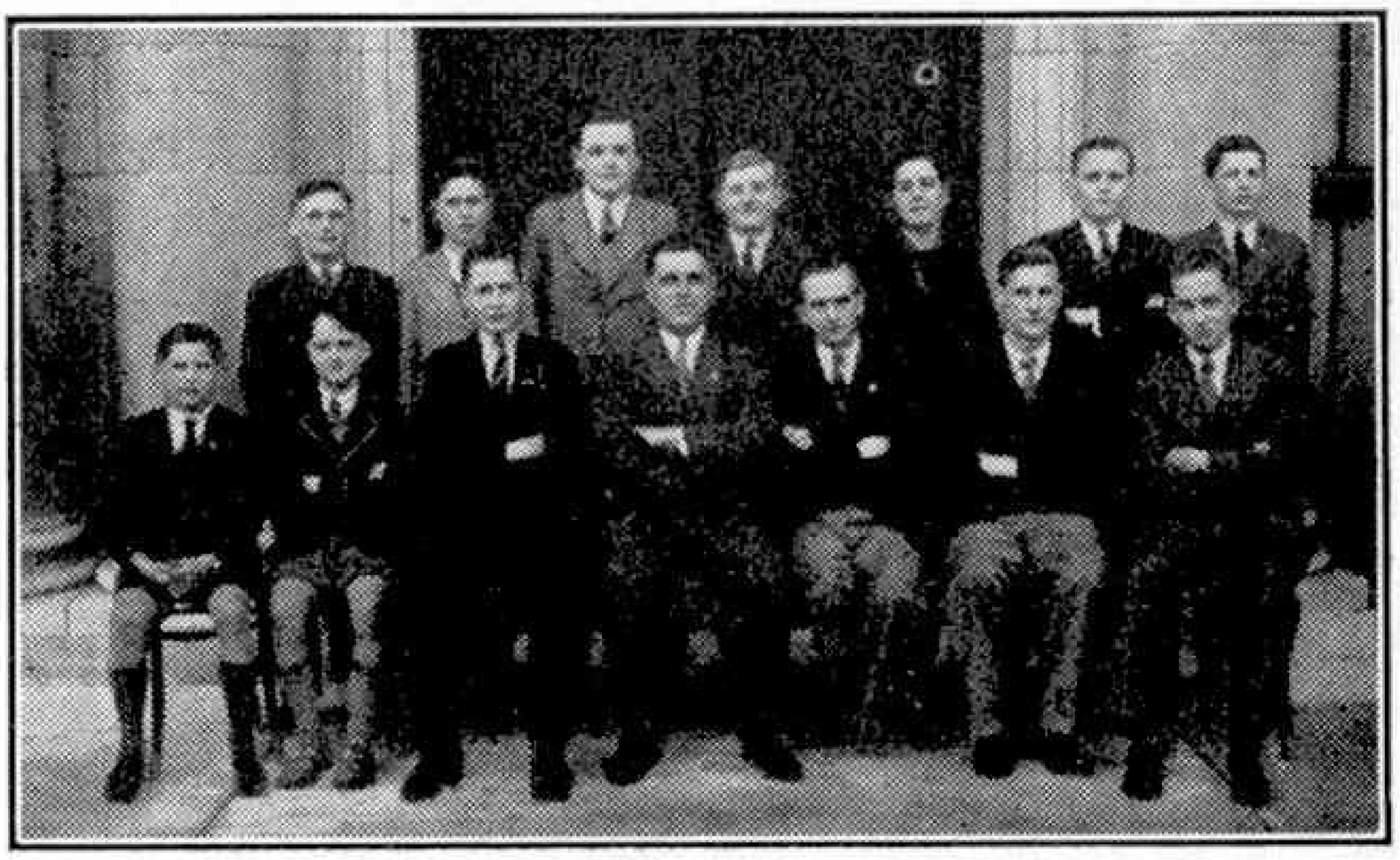
HORNSEA M.C.—Every section has enjoyed good meetings. Some have been given Talks on laying out Hornby Railway track, and operations have been carried out afterwards. A Debate has been held on "*Electric Trains v. Steam Trains.*" Film Displays, Lectures on "*Stars*" and other topics, and Games have completed excellent programmes. Senior members have had Lectures on how to make up talks, as part of their training for section leadership, in accordance with the excellent scheme followed in this Club. Club roll: 24. *Secretary:* P. Richardson, 14, Grosvenor Terrace, Hornsea.

AUSTRALIA

THEBARTON TECHNICAL SCHOOL M.C.—Meetings are held in alternate weeks, and the Club Library is open when no meeting is held. Models built by members were displayed by Mr. E. S. H. Gibson, Leader, who also gave a brief outline of the previous activities of the Club. An interesting visit was paid to a tramcar depot, where the process of fitting tyres on wheels and other interesting operations were watched. Club roll: 55. *Secretary:* W. T. Allen, Thebarton Technical School, Ashley Street, Thebarton, South Australia.

NEW ZEALAND

SPRING CREEK M.C.—Meetings have been carried on by Mr. Bateup during the absence of Mr. L. Sharp, Leader. They have included Model-building Nights, and Lectures by the secretary on "*Acetylene Welding.*" Games Nights are held regularly and are very much enjoyed. Club roll: 10. *Secretary:* D. G. Corbett, Spring Creek, Blenheim, Marlborough.



Members of the 3rd Mareham-le-Fen Boy Scouts M.C., with their Leader, Mr. W. Claxton, and secretary, H. Epton. The Club was affiliated with the Guild in August 1940. Members are grouped in "firms" for constructional purposes, and get good fun out of their model-building. Among large models built by the firms was a fine girder bridge that was lifted into position by a large crane.

Branch News

LOUGHTON.—Track nights are well attended. The layout has been altered and extended, and new members are given practice in manipulating the signals. Four superintendents of the line have been appointed, together with officials to take charge of locomotives, coaches and wagons, and signals and electric apparatus respectively. Each superintendent has competent assistants, and operations proceed smoothly as a result of their care. *Secretary:* R. J. Ruffell, 10, Elmhurst Way, Loughton, Essex.

1ST ROUNDHAY (LEEDS).—Preliminary talks on preparing engines and rolling stock for the road were followed by successful timetable working. Two sections have been formed, to be known as "Wheels" and "Axles," and regular competitions in shunting and other operations are arranged for them. Other meetings have been devoted to signalling practice, and the secretary has given a Talk on "*United States Railways.*" An Exhibition is planned for this month. *Secretary:* F. G. Simons, 114, Talbot Road, Leeds 8.

BEECH HALL (MACCLESFIELD).—A new layout is tried at each of the working meetings, and passenger and goods services are arranged. At one meeting special attention was given to goods yard practice, and members had a very busy time. Plans are now being worked out for the construction of a large marshalling yard. *Secretary:* J. Cheetham, Niarbye, Barlow Road, Romiley, Cheshire.

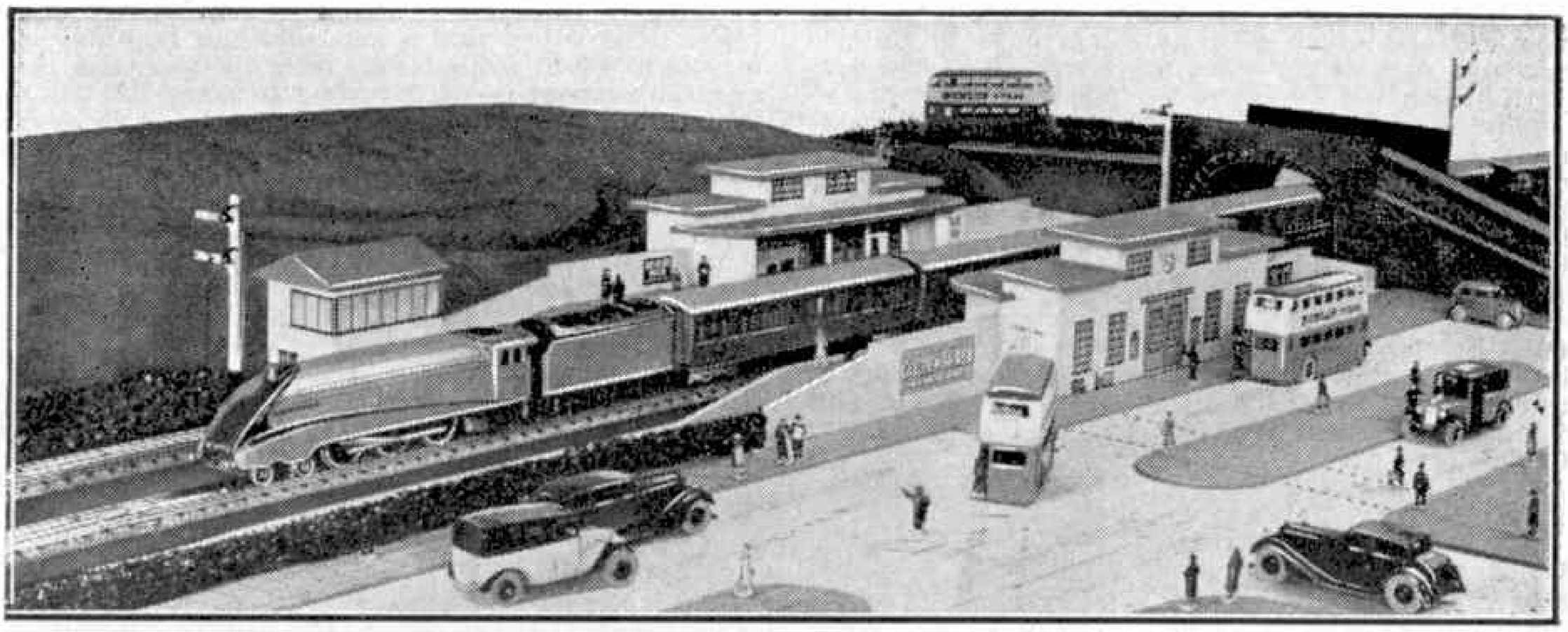
ACTON.—A "Fifteen Month Plan" has been adopted to improve the Branch accommodation and operations. It is hoped that a good hut can be obtained for use as Club Headquarters after the war, and the new Club layout is being revised to make it fit into the new scheme. Other meetings have been devoted to Film Shows, at one of which a film dealing with four main line express trains was exhibited. Music and sound effects accompanied this film. Mr. F. F. Mothersole exhibited an Island Platform Station that he had constructed. Members are now busy with scale drawings for the projected new layout and building. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

BARNARD CASTLE.—The track has been greatly improved by the addition of interesting accessories, particularly at stations. An Exhibition is to be held this month. A special layout has been designed for it, and members of the team that will carry out operations on it have been given thorough training. Talks on various topics are to be given by Masters of the School. *Secretary:* R. Churchill, The School, Barnard Castle.

DUMPTON HOUSE SCHOOL.—Good progress has been made. The track has changed and improved and excellent running has been enjoyed. At one meeting a miniature of the "*Sunny South Express*" was operated, while miniature "Royal Scots" also have been run. Young visitors to Branch meetings have greatly enjoyed the fun. *Secretary:* P. J. L. Binns, Crichel House, Nr. Wimborne, Dorset.

SEATON DELAVAL.—The overhauls of rolling stock have been continued, and the track has been greatly improved. Lineside features have been added, and these have given a more realistic appearance. Both goods and passenger trains have been run, and members particularly enjoy operations when all trains are run under supposed wartime conditions. Special troop trains are run regularly. It has been decided to devote one meeting a month to overhauling rolling stock and keeping the track in good order. *Secretary:* S. J. O'Donnell, 104, Astley Road, Seaton-Delaval, Northumberland.

COATHAM SCHOOL (Redcar).—Members of this new Branch enjoy operations on a large permanent track that has been carefully tested in order to ensure good running. Fast and slow lines are provided, and avoiding lines are laid at intermediate stations for the use of expresses. A goods yard is included, and shunting and marshalling operations are carried out while mainline running is in progress. *Secretary:* W. V. Granger, 78 Burnsville Road, Grange Town.



An effective Station layout including a road bridge as referred to in this article. Note the Pavements, Hedging, Motor Vehicles and so on.

Hornby-Dublo Lineside Improvements

ONE of the first things that strike the miniature railway owner who has developed a satisfactory working layout, or even the beginner who has just got used to the operation of his line, is the bare effect of the track. The lines may serve a station or two, there may be signals and signal cabins at the appropriate places, but the system has a "deserted" look because it has no "surroundings." The purpose of this article is to make suggestions for improving matters in this respect.

The interest of a miniature railway is usually centred on its station or stations. Often the "railway" part of the station is quite complete, with signals and signal cabins in their appointed places, and a sprinkling of miniature figures, railwaymen and passengers on the platform; but the "road" side has a bare look. Pavements are necessary, and good use can be made of the components of the Dinky Toys Pavement Set.

Most model railway owners have these sets in their possession, but if not it is not really difficult to make some pavements from cardboard of suitable thickness. Boys handy at woodwork will no doubt prefer to use plywood, or any smooth wood that is not too thick. The cutting of the card should be done with a sharp penknife, using a steel ruler or a Meccano Strip or Girder as a guide. Any curved shapes can usually be managed by using a tin-lid or any similar item to be found at home to guide the knife. Woodworkers will probably choose a fretsaw for their operations, or for the straight cuts at least, a small fine-toothed saw. To finish off the various pieces they can be painted; the ordinary water-colours found in paint boxes can be used if no flat paint is available, and a light grey shade will be quite satisfactory. Finally the marking of the stones should be done by means of pencil lines, the kerbstones running lengthways at the outer edge of the pavement not being forgotten.

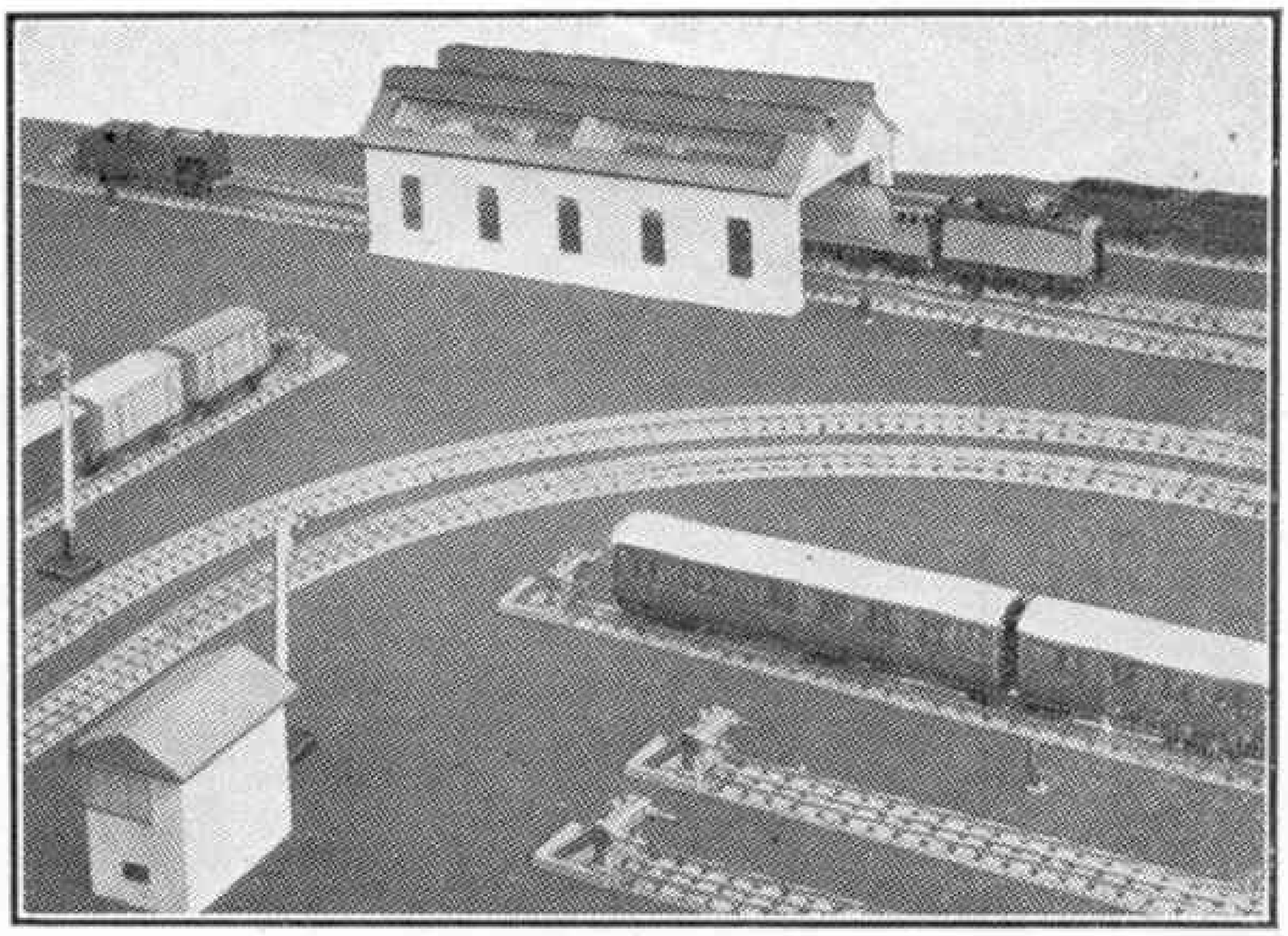
Similar methods can be employed for "building" brick walls such as the retaining walls that may be necessary at certain parts of the line. Walls of wood can be finished off at the top with a narrow strip of wood representing the coping. Sections for use alongside straight parts of the line can be in as long lengths as convenient; where the line curves a series of short sections each at an angle to the other will make it possible for the wall to follow the track satisfactorily. Miniature Posters of the Hornby Series can be attached to the walls, and in addition advertisements can often be made by cutting portions of the labels found on the containers of different products used in the house. This relieves the bareness of a long stretch of "wall" and adds to the realistic appearance.

On a permanent layout the setting up of miniature walls presents no difficulty for they can be attached directly to the baseboard supporting the railway. A layout that is put down when required, however, needs such accessories as this to be portable like the rest of the equipment. Cardboard walls can be provided

with "legs" at the back for support in much the same manner as showcards are supported in shop windows. For wooden walls small metal strips forming "feet" can be attached on the bottom edge at right angles to the length of the wall. Alternatively "legs" or struts can be fitted at the back, or a continuous base consisting of a strip of thin wood can be arranged for support.

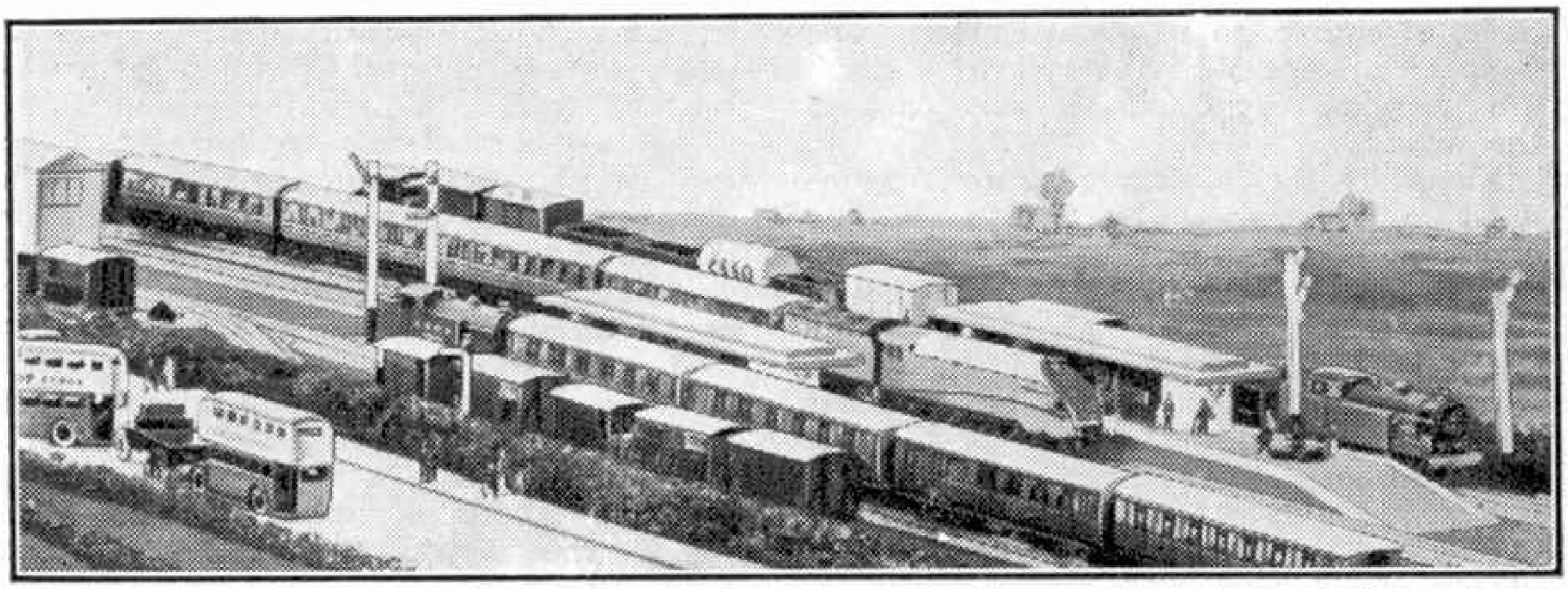
Naturally it is hardly likely that each corner of the layout, where the main line is oval in form, will be rounded off by means of a retaining wall, fencing or other feature. It may be necessary to include a building such as the Hornby-Dublo Engine Shed in the space left at a corner of the baseboard or table. One of the illustrations to this article shows an Engine Shed placed outside the main track. Apart from its usefulness in the stabling of Hornby-Dublo Locomotives the Engine Shed is distinctly effective as a "lineside" accessory. Quite often it is possible to place it in one of the corners of a system that otherwise would have been bare and empty. The Hornby-Dublo Goods Depot may be used in a similar manner.

Another scheme to mask a corner to a certain extent is to arrange an overbridge to cross the line about half-way round the curve at any given corner of the system. A road bridge such as that shown in the illustration on the previous page is not difficult to make in either cardboard or wood, and we have previously given some hints on this point. A bridge of this kind can be finished either by painting and lining out in a similar manner to that suggested for the walls mentioned earlier in this article, or by means of the printed "brick papers" that are available commercially for this purpose.

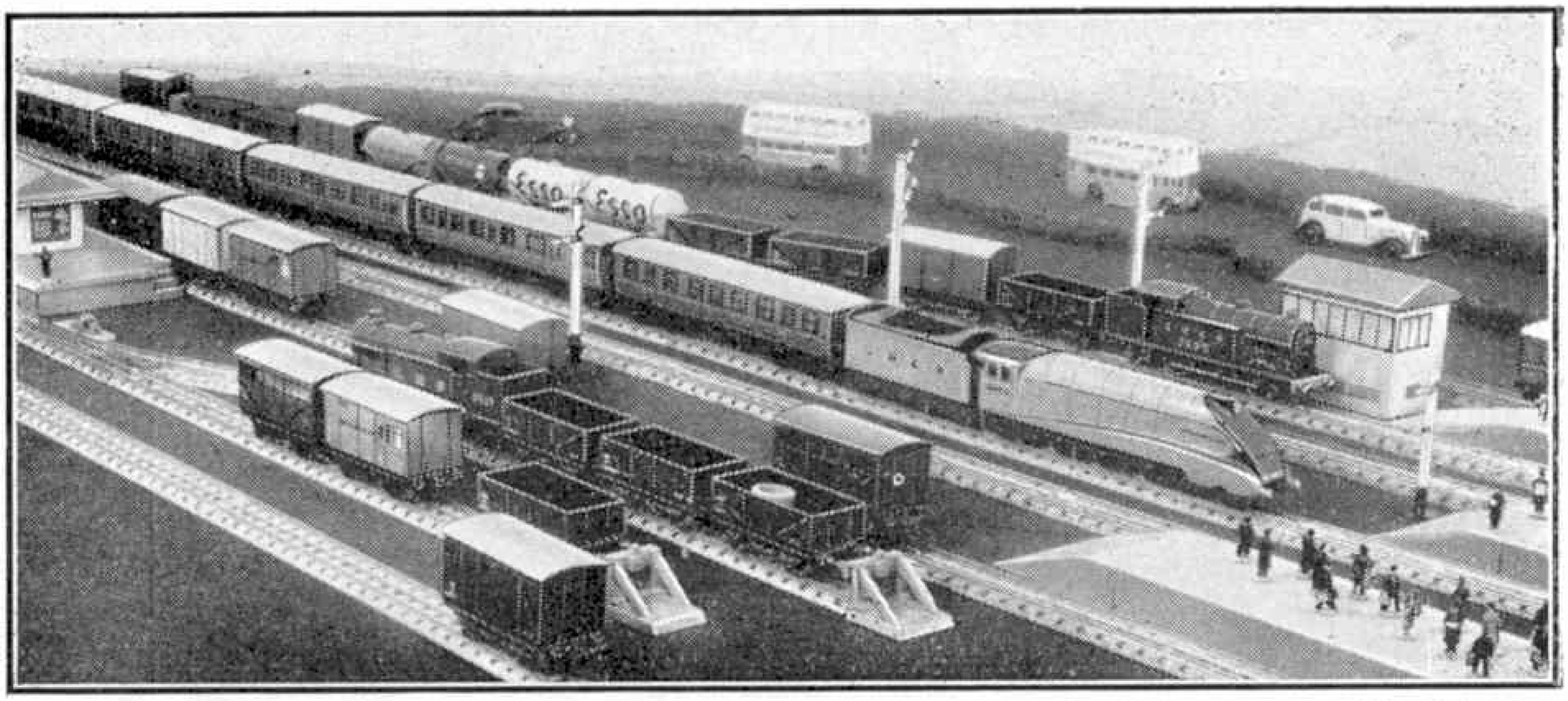


A corner of a layout showing how the Engine Shed is used ou si le the main track, and in this position relieves the obvious "corner" effect.

The Hornby-Dublo railway owner can edge his railway property by means of Hornby Hedging which is quite good for the purpose. The standard gauge 0 Paled Fencing is really too high for use on Dublo systems. Alternatively a series of holes can be bored along the side of the line to receive dead matchsticks, now unfortunately rather scarce! These can be joined up by means of fine wire or thread, and will resemble fairly well the post and wire type of fencing that is sometimes found enclosing our real iron roads. For a temporary line such fencing will have to be made in sections, each one having a base consisting of a strip of wood into which the miniature posts can be driven instead of into the baseboard. A point to



Suburban and express trains at a Station. The siding in the foreground and the goods yard are realistically arranged.



Part of a Hornby-Dublo layout, showing the main line with a goods yard and depot on one side of it. On the far side is a loop line used by slow passenger and goods trains.

be borne in mind when the holes are being arranged is to avoid having them all in a dead straight line; a little weaving from side to side greatly adds to the natural appearance of the fence. In a similar manner a little unevenness in the height of the posts does no harm. Real railway fencing is seldom perfectly straight, and it cannot be level where the surface of the ground is at all undulating.

The provision of roads, bridges and so on immediately suggests the reproduction of motor and pedestrian traffic and here again the various motor vehicles of the Dinky Toys Series and the miniature figures of the Dublo System can be used very well. Road traffic will include Motor Buses running in connection with the passenger train services on the railway and goods vehicles of various types collecting and delivering traffic in connection with the work of the Goods Depot. The actual running of these motor vehicles can be quite entertaining even though they have, of course, to be pushed along. The younger members of the railway "staff" are usually very keen on this part of the work.

Naturally the miniature Motor Wagons must not appear to be always running about without a load, so that the keen "Goods Manager" will see that he has a stock of cases or boxes to place on the decks of the vehicles. Small blocks of wood of different sizes can be used for these. In every household are to be found little oddments that can be made to represent goods of various kinds. A few of these placed on the loading platform of the goods depot look realistic.

Between the road and the railway at certain parts of the layout it may be necessary to have a stretch of ordinary country or grassland. Here the owner of the permanent system has the advantage as the material used can be fixed down, having been stretched over a suitably rough surface. Paint can then be applied if necessary and the shades varied to suit the supposed variation of the "countryside." The owner of the portable line has less opportunity, but he can get quite a good effect by using pieces of material such as felt or something similar that have been cut to fit in certain places.

To complete the setting of the line some readers may be able to provide a scenic background. One difficulty on a layout on a table that is accessible on all sides is that a background should be fitted along each edge of the table or board, and the appearance of the whole may be spoiled by the "fenced in" effect thus given. One solution is to provide a background only on that side opposite to the operator when he is in his usual position for working the traffic. Where the layout table is against a wall the background scene can be painted or done in chalks on a strip of strong paper or card, and this can be pinned to or suspended from the wall itself. Every miniature railway owner no doubt will have his own ideas as to the best course to follow, and we shall be pleased to hear from any who develop layouts on these general lines. We hope to describe in an early issue a portable layout of attractive design in which the scenic features have been specially studied.

A Hornby "L.M.S." Railway

THE initials "L.M.S." are everywhere familiar and certainly no "*M.M.*" reader is likely to be unaware of what they stand for. There is however another L.M.S., of which details are given on this page. This is a Gauge 0 railway, operated by clockwork locomotives, and its title in full is the "*Larcenton, Murston and Swinford Railway.*" It is owned and operated by our reader B. Tatford of Wallington, Surrey, from whose notes the following description has been composed.

The layout is fairly extensive and occupies three rooms and a short passage connecting them. The plan of the line, which is unusual but effective, has been devised to make the utmost use of the space available to obtain a long continuous run and yet to allow terminus-to-terminus operation if desired. The main station is known as "*Larcenton Central,*" situated practically in the centre of one of the rooms. It is not actually a terminus although the principal "down" trains start from there. It has some terminal or dead-end roads, but the two chief tracks are carried through the centre of the station. Then they diverge from one another, each turning through a semi-circle and following a wall of the room, finally crossing the approach to the station at the opposite end from the point of separation, and becoming one. Thus a train can run through the station say on the "up" track, double back behind the station, cross the main tracks, and then, passing behind the opposite side of the station, can again run through the platforms in the "down" direction.

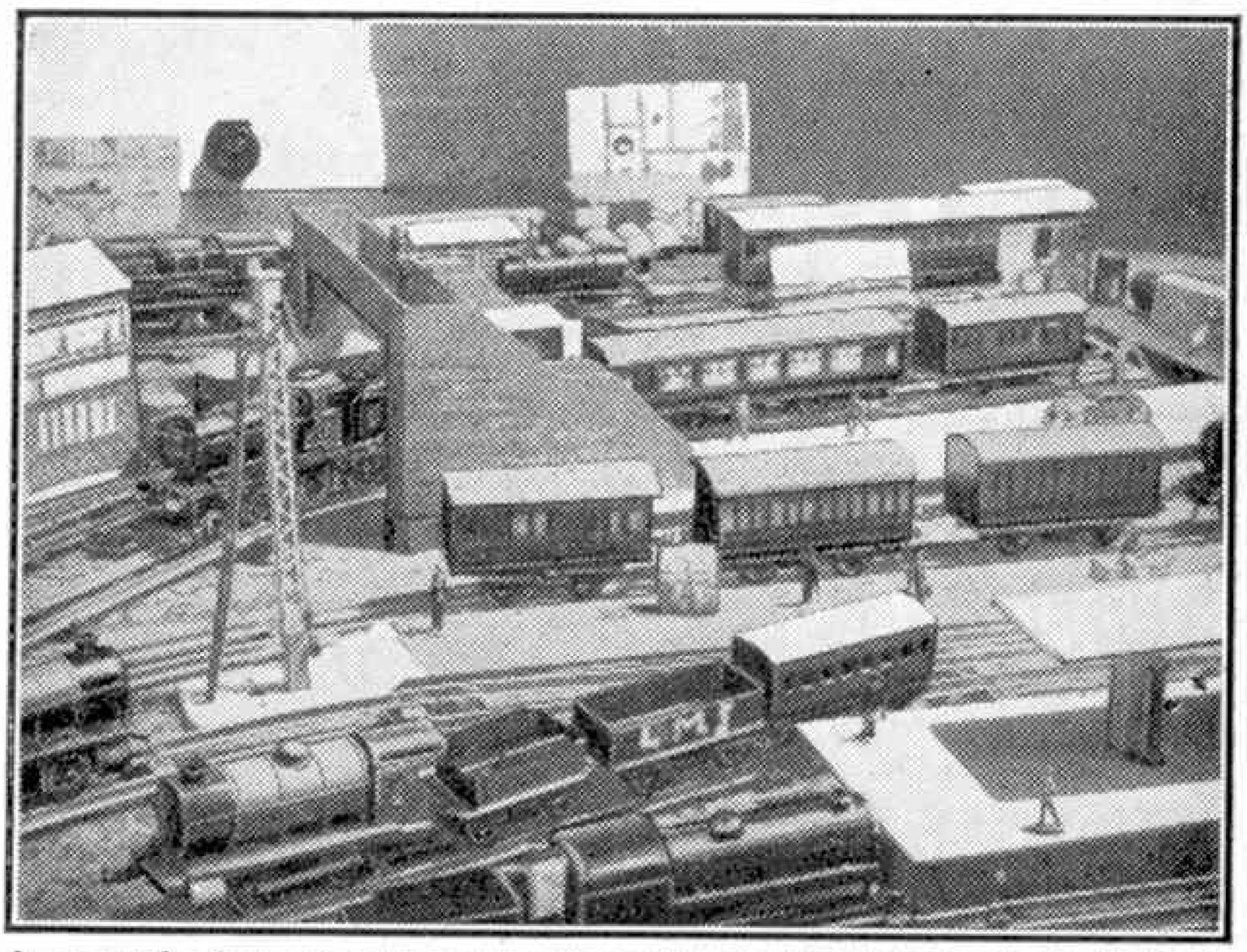
The main up and down tracks pass diagonally across the room in which the station is situated, through the passage previously referred to, and so reach the room where most of the main line runs. The layout in this room is roughly oval, corresponding to the walls of the room, and for practically half of the distance double track is available. The single track part of the line continues round the room to rejoin the down line at the point where this enters the room. Crossover points are placed here also so that the single track section is here connected to both up and down tracks.

The passage lying between the three rooms accommodates a junction leading to a branch line that serves "*Methven,*" a seaport station which, with its sidings, engine sheds and premises generally, occupies most of the space available, the room itself being fairly small.

Probably the best way to take in the general situation and character of the line will be to take an imaginary trip on one of the most important trains on the line, the "*Boat Express, Larcenton to Methven Docks via Murston,*" as it is described in the time-table. The road approach to "*Larcenton Central*" passes over the return loop previously mentioned, runs parallel to the platforms and leads to the booking hall at the terminal end of the station. Actually this road approach divides "*Larcenton Central*" from "*Larcenton West,*" another station lying parallel to "*Central*" but situated on the return loop.

In the illustration on this page the "*Boat Express*" can be seen standing alongside one of the platforms with an L.M.S. Standard Compound at its head, this of course being one of the well-known Hornby No. 2 Special Locomotives. Starting off we pass beneath the footbridge seen in the illustration and cross the return loop at right angles on the level. Soon the train passes "*Ayrre,*" the station that actually forms the junction point for the "*Methven*" branch. For the moment however we are not concerned with the junction, and carry straight on through "*Ayrre*" and into pleasant country beyond in which Dinky Toys figures and animals are seen to advantage.

After a level crossing more "town-like" scenery begins, and the signal gantry spanning the tracks here heralds the approach to "*Seven Elms.*" This has platforms served by both the double and the single track section of the main line. "*Murston,*" the next station, on the other hand, consists of an island platform situated between the up and down tracks.



A general view of "Larcenton Central" on the layout of B. Tatford, Wallington, described on this page. The "Boat Express" is headed by a Hornby No. 2 Special Locomotive.

Soon after this the two tracks unite and the train proceeds along the single track section to retrace its path actually to "*Larcenton Central*"; this arrangement together with the return loop layout at "*Larcenton*" gives trains a much longer mileage than otherwise would be the case.

So we pass through "*Larcenton Central*" and bear off past the engine sheds, through "*Derry,*" a small station on the lower return loop and then crossing the main tracks again at right angles come to "*Larcenton West.*" A tunnel brings us back into "*Central*" at the terminal end and we again pass through the platforms and so reach "*Ayrre.*" This time the junction points are set for the branch and with much weaving and turning we come alongside the platform at "*Methven Docks.*" This station has a run round loop line for the benefit of locomotives that require to make the return journey immediately. Our engine however is uncoupled and is run forward into the engine shed, which is built over a track forming an extension to the platform line.

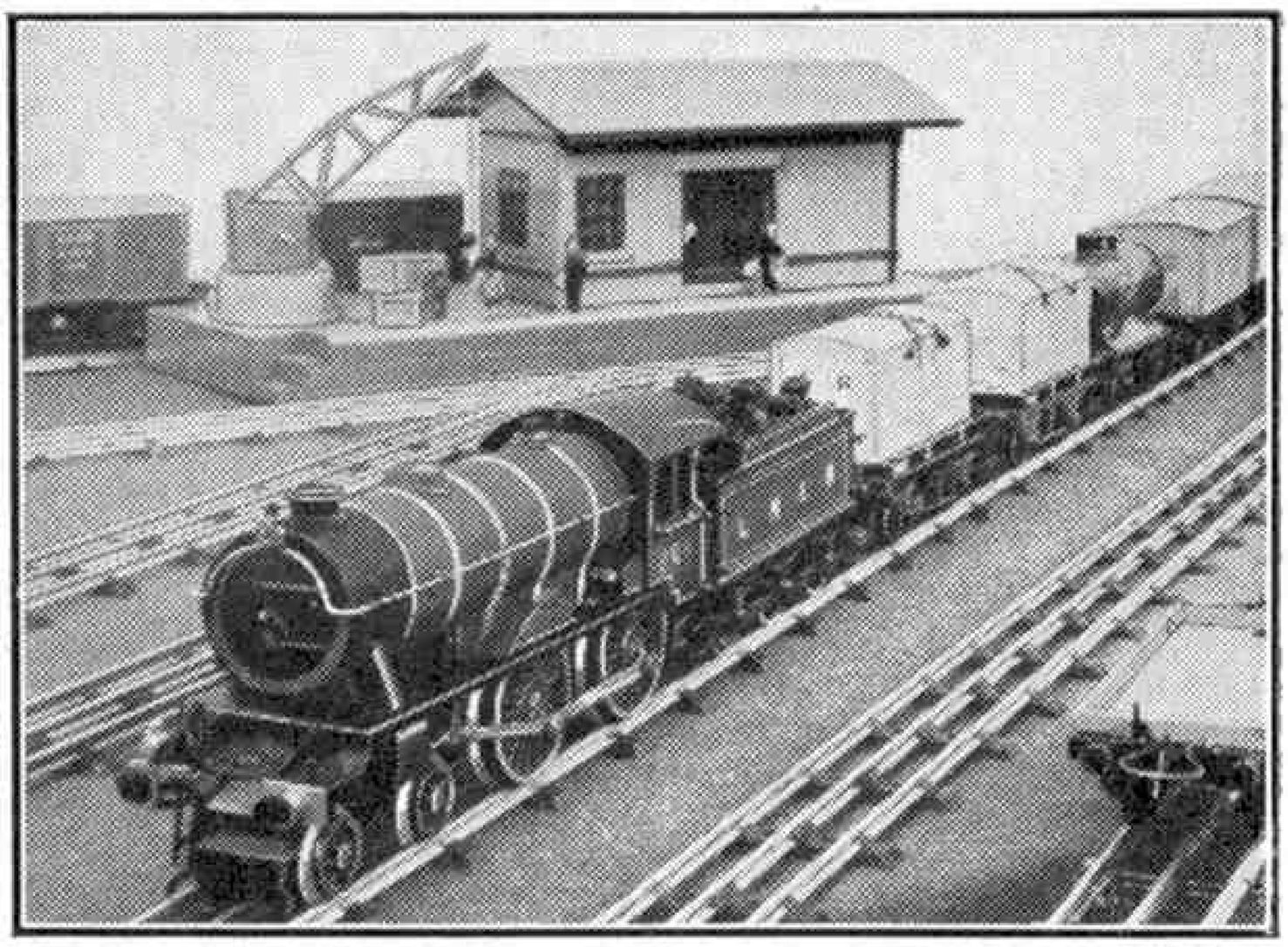
Hints on Hornby Train Formation

ONE of the most fascinating branches of model railway working is the assembly of the various trains to provide for the services that the operator has in mind or that he has included in his time-table. The miniature railway owner seldom has sufficient stock to cover every requirement, but, with various combinations of vehicles and a certain amount of adaptation, it is possible to make quite a good showing. Certain vehicles may have to serve various purposes and may require to be switched from one service to another, but this really adds to the fun. A well-balanced selection of stock will meet most requirements and will be more fascinating to manage than would be the case if the railway boasted examples of every type of vehicle in the Hornby Series.

Most layouts, at all events in their earlier stages of development, possess a mixture of rolling stock. Even the principal express may have to be formed of an assortment of vehicles, but the result need not be displeasing or unrealistic. As an example let us take the miniature *"Cornish Riviera Limited"* shown in the upper illustration on the next page. Here the train includes Hornby No. 2 Corridor Coaches, but evidently additional luggage accommodation has been required. This accounts for the No. 1 Guard's Van next to the tender of the engine. Although a four-wheeler, the design of the Van closely matches that of the bogie coaches, and this use together of the No. 1 and No. 2 types is quite pleasing.

If a Guard's Van does not happen to be available in such a situation as this, a No. 1 Luggage Van could be used. Vans of this kind are often attached to passenger trains. A No. 2 Luggage Van would be better still, as most companies now have large bogie "general utility" vans that can run in passenger train formations for the conveyance of luggage, parcels and so on. Either of the Luggage Vans may have to be taken from the goods yard at short notice when assembling the passenger train, or they may have to be worked along the line for the purpose, and the operations necessary will only add to the fun of working.

On many layouts it is often necessary to use both bogie and four-wheeled stock together in the same passenger train. A scheme that is favoured by many of our readers is to form the main part of their principal express of, say, No. 1 Coaches. Any special accommodation that is called for, a restaurant car for instance, is provided by a bogie vehicle. The L.M.S. and S.R. No. 2 Corridor Coaches can be used quite successfully for this purpose, because they are of the end-door vestibuled pattern, and in this respect resemble the average restaurant cars found on the two systems in question. The No. 2 Saloon and Pullman Coaches can be employed in a similar manner.



A Hornby L.N.E.R. express goods train conveying a mixed load. Containers, a Tank Wagon and various Vans are included in its make-up.

A point that sometimes escapes attention in miniature practice is the arranging of proper guard's and luggage accommodation at the ends of a train. Sometimes it is excusable on a model railway to omit a Guard's Van or brake-end Coach at the leading end of a train, but whenever possible a vehicle of either of these types should be provided at the tail end.

Where no corresponding composite

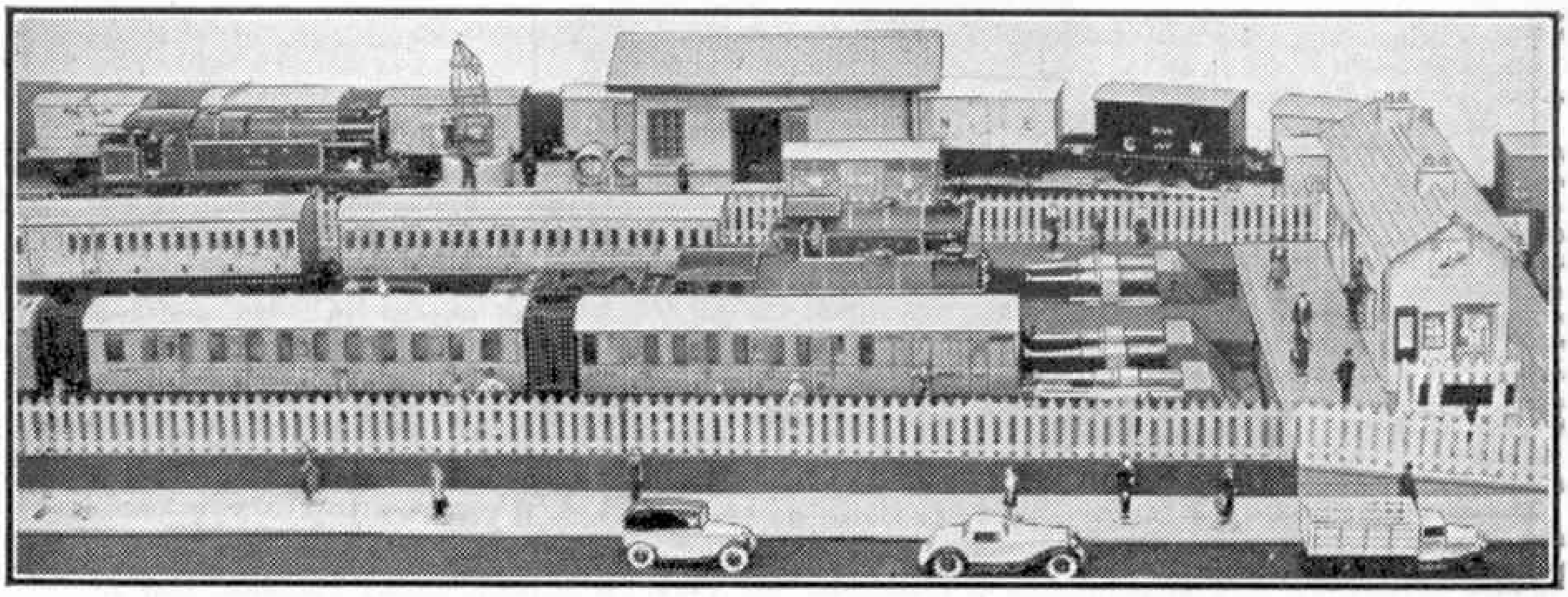
A miniature "Cornish Riviera Limited" composed of Hornby No. 2 Corridor Coaches with a No. 1 Guard's Van added to give increased "luggage" accommodation.

vehicles are available, as in a train of No. 2 Pullmans or Saloons, the best thing to do is to use No. 1 Guard's Vans in the livery of the "company" that is operating the train. It is advisable, where several bogie coaches are marshalled together and four-wheelers are to be run at the ends of the train, for the four-wheelers to be fitted with die-cast wheels. On a short train however this is not necessary.

Much more latitude in the choice of stock can be allowed when freight trains are being operated, except in the case of the most important "express goods" that may be supposed to carry some particular item of a perishable nature such as meat or fish. Then the appropriate vans for the purpose should be provided. Any shortage of a particular kind of van can be made up to a certain extent by the useful Luggage Vans mentioned previously in this article. These must be imagined to be fitted up in whatever special manner is called for by the traffic being conveyed.

Naturally a greater variety of wagons can be used in a freight train conveying a miscellaneous load such as that shown in the illustration on the previous page. This includes containers carried on the usual Flat Trucks, an Oil Tank Wagon, and so on.

Whatever its composition a goods train should always be completed for a run along the main line by a Goods Brake Van. Movements of trains in yards, on dock estates and similar premises are often made without a brake van, but then the speed is low and the journeys are usually made on level track. On a main line run however the brake van on the ordinary loose-coupled goods train has an important part to play in assisting the engine to control the running of the train on the various ups and downs.



An interesting terminal station view showing a variety of trains. An express and a local train are in the foreground and there is an express freight train assembled in the background.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

A LEANING TOWER IN WALES

The famous Leaning Tower of Pisa has a counterpart at Caerphilly Castle, in South Wales. The top of Caerphilly's leaning tower is nearly 12 ft. out of the perpendicular, and is believed to have been in that position for two hundred years or more. Nobody knows how the tower came to lean over. One theory is that a subterranean stream caused subsidence of the foundations; and another that an internal explosion was responsible. It is generally believed that Cromwell's men wrecked the castle in order to render it useless as a fortress, and that the charge of explosive put under the tower was only partially effective, causing it to tilt over but not collapse. The base is "anchored" by masses of fallen masonry, so that there is little likelihood that the tower will ever lean over further.

The castle, which in this country is exceeded in size only by Windsor Castle, is being restored by its owner, the Marquis of Bute, a gigantic task that has already taken 10 years, and is little more than half completed. The leaning tower will remain in its present position.

V. C. HARDACRE (Llanbradach).

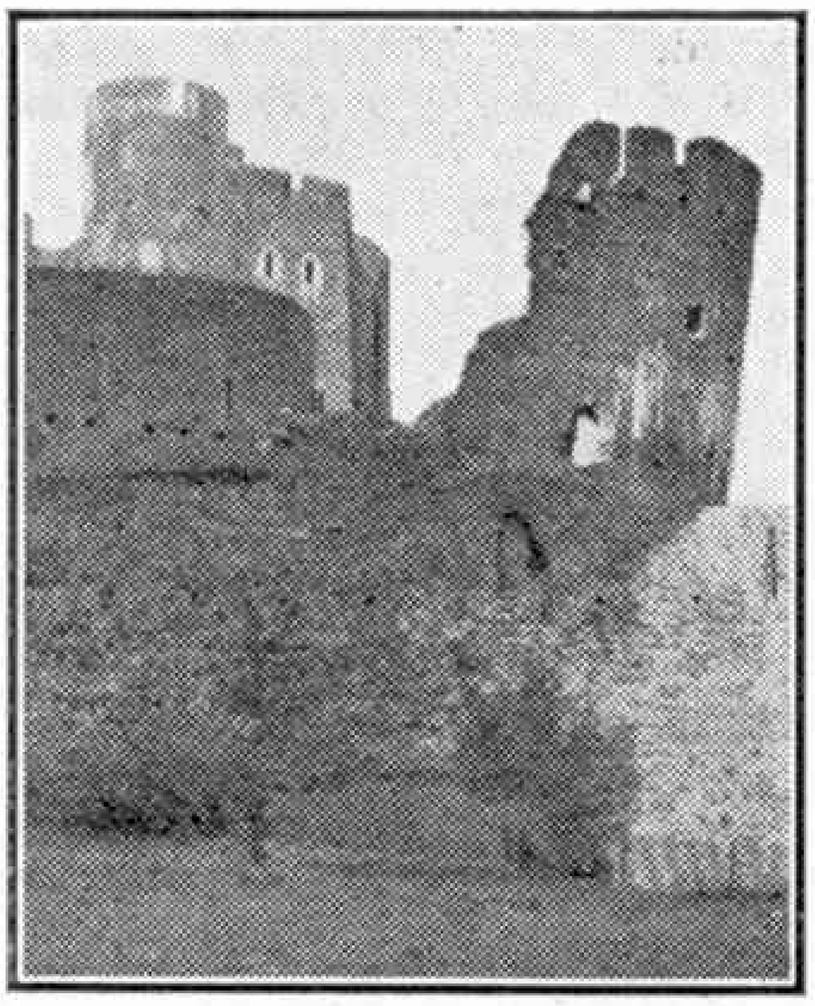
TUNNELLING THROUGH NEW ZEALAND HILLS

Nelson, a New Zealand city of some 12,000 people and the centre of a world-famous orcharding district, now gets its water from a dam about five miles from the town that was built about 1870. In order to increase the supply a dam is being erected across the Roding river, which runs behind the 2,000 ft. hills skirting the town. A tunnel some 8,800 ft. long and 6 ft. by 4 ft. in section has had to be bored through the hills to carry the water. Boring was commenced from both ends. The rock was hard and very wet, and as the tunnel has a gradient of 1 in 240, pumps had to be installed at the end farthest from Nelson, because floods interrupted the work and swept away much material.

In accordance with modern practice, drilling was carried out by means of compressed air "jack-hamers" with removable bits, which were sharpened by a special grinding machine. The tunnel was completed in less than two years, and the two sections were in perfect alignment when the work was finished, in October 1940. The bore is unlined except where the rock is soft.

The new dam is 40 ft. high and 80 ft. long and can be raised if necessary. Great storage capacity is not required as the river has a minimum flow of 3,000,000 gallons a day. In order to build the dam it was necessary to divert the river through a 200 ft. tunnel.

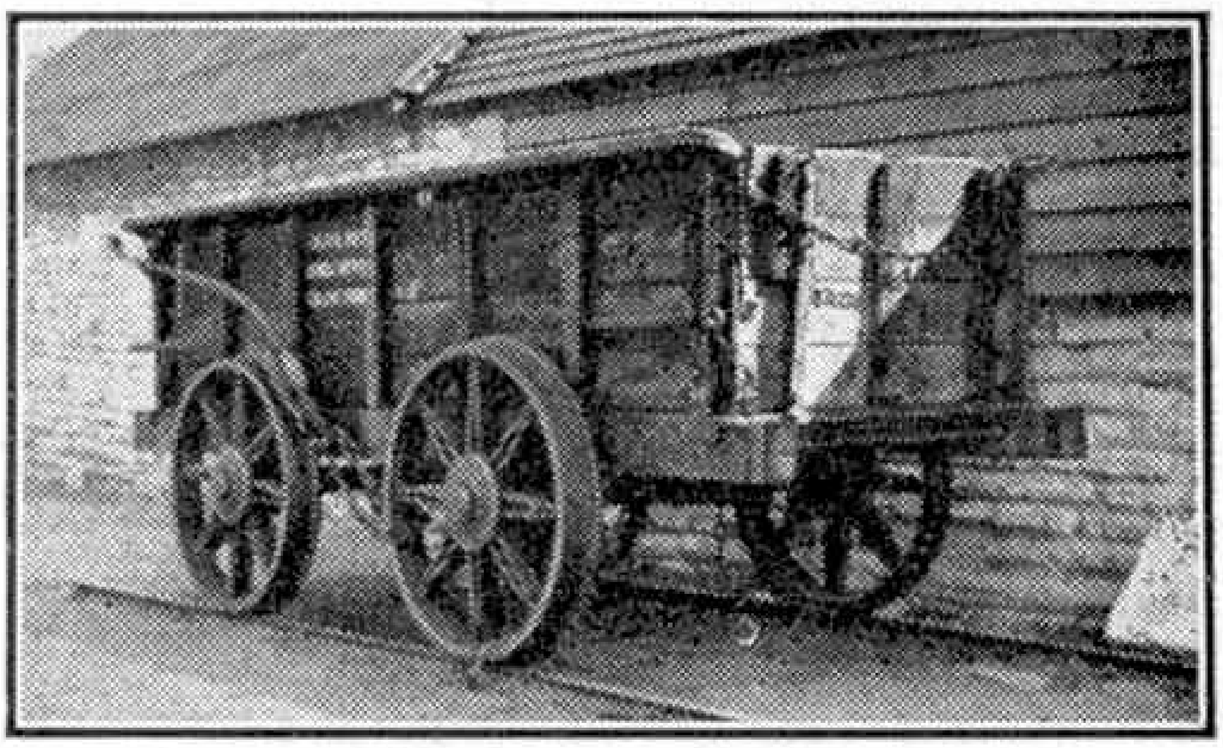
W. W. JENSEN (Nelson, New Zealand).



A British example of a leaning tower, to be seen at Caerphilly Castle. Photograph by V. C. Hardacre, Llanbradach.

AN INTERESTING OLD GOODS TRUCK

While on a visit to Stratford-upon-Avon I came across an interesting railway relic in the form of one of the old goods wagons of the now defunct Stratford and Moreton-in-the-Marsh railway, on which the wagons were drawn by horses. The truck, which is on the northern approach to Old Railway Bridge over the River Avon, is a box-like affair, with rather finely-designed cast wheels. It was made by Smith and Willey, a firm of railway engineers of over 100 years ago whose foundry was at the corner of Smithdown Lane and Falkner Street, Liverpool. The rails on which this old truck rests are of the early fish-bellied pattern, fastened to squared blocks of stone placed a yard apart, instead of wooden sleepers. This method was adopted on early railways.



A horse-drawn goods truck constructed in 1826. This was in use on the Stratford and Moreton-in-the-Marsh railway. Photograph by C. R. Rowson, Liverpool.

This remarkable little railway, which had a branch to Shipston-on-Stour was of 4 ft. gauge. It was constructed under the direction of Thomas Telford, who built the Holyhead Road and other coaching highways, the Caledonian Canal and innumerable bridges. It was the only railway actually built by Telford, although he planned others. The line to Moreton was opened in 1826 and was in daily use until about 1859, mainly for carrying coal and quarried stone. The line came eventually into the possession of the G.W.R., which converted part of it into a steam-operated railway that is now open only for goods traffic. The rest of the track was taken up in 1918 to provide steel for munition making during the final year of the Great War. The narrow bridge by which the line crossed the Avon at Stratford is now used as a footbridge.

CYRIL R. ROWSON (Liverpool 11).

Competitions! Open To All Readers

Which Were the Most Popular Covers in 1941?

Readers thoroughly enjoy our annual Cover Voting Contest, and this month we ask them to tell us which of the 1941 covers they like best. These covers are illustrated above. The reproductions do not give any idea of the brilliancy and colour of the originals, but they will serve as a guide to competitors.

All that is necessary in this contest is that each entrant shall state on a postcard: A, the cover that he likes best; and B, what he thinks will be the order of popularity as decided by the votes of competitors. The covers must be referred to by the names of the months in which they appeared, and it is not necessary that a competitor's own favourite should be at the head of list B.

The names and addresses of entrants must be written on their postcards which should be addressed to *"1941 Cover Voting Contest," Meccano Magazine, Binns Road, Liverpool 13.* There will be separate sections for Home and Overseas readers, with prizes in each of 21/-, 10/6 and 5/- respectively for the best entries. Closing dates: Home Section 31st January; Overseas Section 30th May.

Spot the Errors

This month we have a railway story to tell. It is a queer one, as every reader will soon realise, and it will be found good fun to count up the mistakes that the storyteller has made.

"One day when I was making a train journey I had to change at a station that had an adjoining goods yard with many sidings. While I was sitting on the platform seat the "*West Coast Postal*" passed through hauled by a "Castle" class locomotive. Presently a mixed goods train travelling in the opposite direction appeared. This was a long train hauled by a tank engine with a headlamp below the chimney. Next to the engine were four tank wagons full of petrol, and these were followed by coal wagons. Then came an assortment of brake-fitted vans and hopper wagons conveying ballast for track relaying, followed by the brake van.

"Soon an 0-10-0 tank locomotive came along the main line and passed into the goods yard to commence shunting. This locomotive first collected all the cattle trucks ready to add them to the next pick-up goods train. As there were very few wagons left, the locomotive hauled them to one track and left them to be unloaded, and then returned to the sheds.

"Presently a puff of smoke appeared in the distance and at last my train pulled up in the station, after being held up for a few minutes at the distant signal. The locomotive was No. 5600 "*Bermuda*" of the "Jubilee" class, and the coaches were of the latest steel-panelled design painted brown and cream. I had rather a large parcel with me so I put it into the guard's compartment, where I noticed the lever that operated the mail pick-up device. This however was not used on the journey.

"I soon arrived at my destination, although we were held up at the home signal outside the station, as we did not have to stop anywhere else, all home and distant signals showing line clear. As I left the platform I gave my ticket to the driver and then proceeded to the Lost Property Office to leave my luggage."

For the best list of errors in this story we offer cash prizes of 21/-, 10/6 and 5/- in each of two Sections, for Home and Overseas readers respectively. Entries should be addressed "*Spot The Errors Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section 31st January; Overseas Section 30th May.

January Photographic Contest

Here is the first of our 1942 series of photographic contests, in which prizes are offered from the best photographs of any kind submitted. There are two conditions—1, that the photographs must have been taken by the competitor; and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired. We remind readers that they must not photograph any features of military importance.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed "*January Photo Contest, Meccano Magazine, Binns Road, Liverpool 13.*" There will be separate sections for Overseas readers.

In each section prizes of 15/- and 7/6 will be awarded, together with consolation prizes for other good efforts. Closing dates: Home Section 31st January; Overseas Section 30th May.

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Is **YOUR** collection better than that of any of your friends? **YOU CAN IMPROVE AND INCREASE YOURS FREE!!** You must send for our great new offer. Send at once for our **LIBERIA TRIANGULAR PACKET**; it is **ABSOLUTELY FREE** and it contains a wonderful collection of **COLONIAL, PICTORIAL** and **COMMEMORATIVE** stamps including, as illustrated, the beautiful two-coloured **LIBERIA** triangular (Merchant Ship pictorial) valued at 1/6 and specially handsome issued for registered mail, as well as **FRANCE** "Justice" pictorial; very old **SWITZERLAND**; attractive large **SILVER JUBILEE 1910-1935** of King George V; **AUSTRALIA** (Animals); **U.S.A.** (President); **SWEDEN** (Oscar); **GERMANY** "Eagle" issue; two-coloured pictorial **SOUTH AFRICA**; historical **ITALY** commemoration issue: **EIRE** (Irish "Sword of Light"); **NORWAY** and nice obsolete **NEW ZEALAND**; and a queer Newspaper Stamp of **AUSTRIA** which was only on sale for a limited time. **YOU** cannot afford to miss this opportunity of obtaining this marvellous packet.

Send us 3d. in stamps to cover our posting costs and we will send it to **YOU. ABSOLUTELY FREE.** together with a nice selection on approval. Send to—

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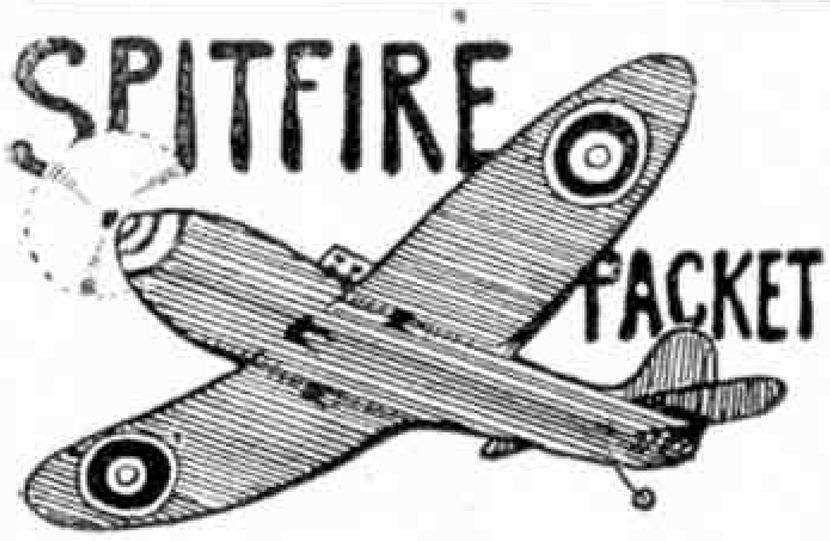

PACKET contains 38 air, triangular, and stamps with aeroplanes on, etc.—2 LIBERIA triangular (with aeroplane); NIGERIA 1½d.; MONTENEGRO (unused); URUGUAY; INDIA (Service); set of 3 CHILE; JAPAN (obsolete); 2 TANGANYIKA; 3 PALESTINE; 6 BRAZIL (including airpost); 5 U.S.A. (obsolete); 2 JAVA; NEWFOUNDLAND; MANCHURIA; MOROCCO, LARGE PICTORIAL; Peru; THAILAND; CEYLON (Pictorial). Price 5½d., postage 2½d. extra. Money back if not satisfied. Applicants for approvals receive 6 Pictorial S. AFRICA and in addition, those sending addresses of stamp collecting friends get an additional set of 4 GEORGIA. **BARGAINS**—100 B. Colonials 1/-; 7 Triangular 7d.; 18 Georgia 10d.; 20 Rhodesia 1/2; 24 new Geo. VI 1/2.

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G. P. KEEF
Willingdon, Eastbourne

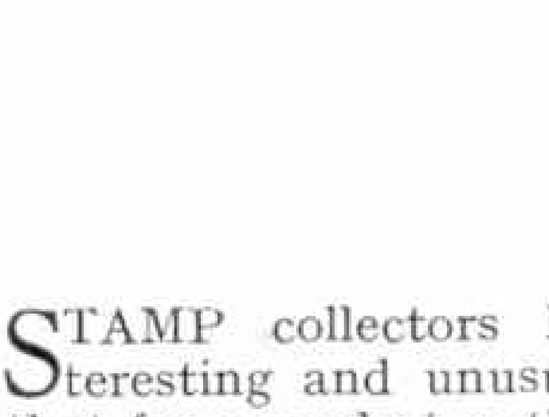
For other Stamp Advertisements see pages 40 and x.

Stamp Collecting

Allied Flags on Stamps

STAMP collectors looking for an interesting and unusual subject will find that for a modest outlay they can make a most attractive display of stamps bearing flags and arms of Great Britain and her Allies.

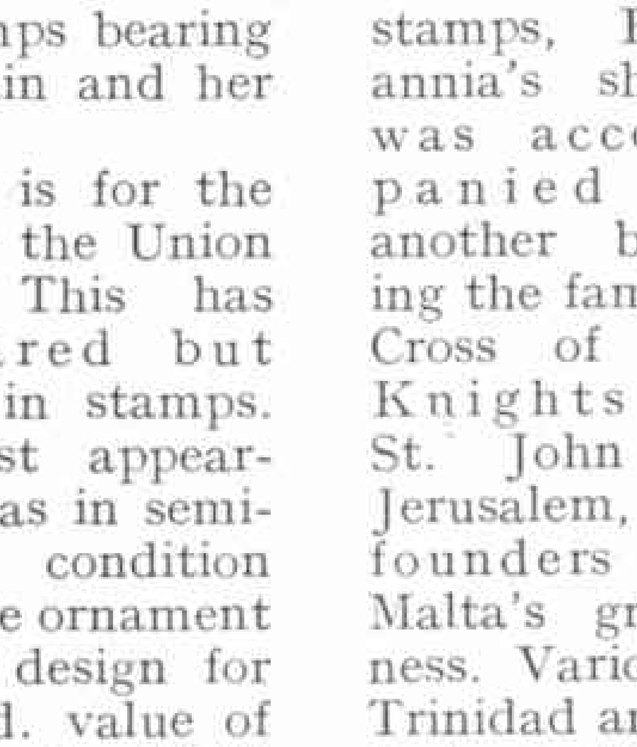
Our first thought naturally is for the flags of the Empire, especially the Union Jack. This has appeared but rarely in stamps. Its first appearance was in semi-furled condition as a side ornament in the design for the 2½d. value of Jamaica's 1919 issue. The stamp is illustrated here and shows a contingent of Jamaica's troops returning home from the European War of 1914-18. When the stamp first appeared the flag on the left hand side was flying upside down. Later the stamp was withdrawn and a corrected design substituted.



The Union Jack design is incorporated in the top left corner of the flag of the Samoan Administration and an excellent picture of this flag appeared on Samoa's December 1921 issue. The Union Jack appears also on the 1d. and 3d. values of Papua's Jubilee of British Administration issue of November, 1934. The design in this case shows the scene at the hoisting of the standard at the formal taking over of the protectorate at Port Moresby in 1884.

The Union Jack design forms the traditional emblem on Britannia's shield, and in this form it is found on the higher values from 2/6 of Britain's King George V issues, and throughout Malta's issue of August 1922. In the lower values of these Maltese stamps, Britannia's shield was accompanied by another bearing the famous Cross of the Knights of St. John of Jerusalem, the founders of Malta's greatness. Various issues of Trinidad, and later, Trinidad and Tobago, also show the Union Jack on Britannia's shield.

The Royal Standard is the most thrilling of all British flags since, when flown with authority, it betokes the presence of the King himself. Its design is the principal feature of the current 2/6 and 5/- values of Great Britain.



Several of the British Colonies have included their arms in stamp designs, but lack of space precludes our listing them all here. The most attractive is the Union of South Africa's first stamp, the 2½d. value issued in 1910. This incorporated the arms of the Union's four constituent Provinces, the Cape of Good Hope, Natal, the Orange Free State and the Transvaal. Other specially interesting designs are the first issues of New Brunswick, Newfoundland and Nova Scotia, all of which incorporated the rose, thistle and shamrock.

Turning now to stamps of the Allies, pride of place must go to the Stars and Stripes of the United States of America. The best picture of the flag on a United States stamp is the design for the Michigan Centennial issue of November, 1935, where it appears with the Michigan State flag.

(Continued on page 41)

A FEW ATTRACTIVE BARGAINS

Coronations complete 202 val., MINT 44/6, USED 56/-, MINT with Album 49/-; Crown Colonies 135 val., MINT 22/-, USED 27/6, Dominion MINT 27/6, USED 30/-; Coronations and Jubilees, single sets, ask for special list. Great Britain King George VI, 2/6, 5/-, 10/-, superfine copies 4/-; Morocco Edward VIII 11 val. MINT 1/-; Western Samoa 1939 Stephenson complete MINT 12/6; Zanzibar Jubilee complete MINT 2/-; Australia K.G.VI £1—USED 9/-; Ceylon Prov. 3c. on 6c. 6d.; Egypt Child Welfare 1940 7d.; 100 diff. Pictorials Whole World 4/3 per packet; Kenya Prov. MINT 3 val., in pairs 1/9 per set

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Free "WORTH WHILE" Free. 10d. IRISH Used

You are not likely to have this elusive stamp in your collection. However, you can have it FREE by asking for a selection of my "WORTH WHILE" approvals of stamps worth while.

JOS. H. GAZE, 10, Pimlico Road, CLITHEROE, Lancs.

For other Stamp Advertisements see pages 38 and x.

Stamp Collecting—(Continued from page 39)

flanking the State Seal. An illustration of the stamp is given here. Curiously enough, much better reproductions appear on several stamps issued by South and Central American countries in honour of the celebration of the 150th anniversary of the United States Constitution. Among the most attractive of these stamps are those from Salvador and Ecuador, illustrated here. Both were issued in 1938 and in each case the Stars and Stripes are accompanied by the flag of the issuing country. Both Salvador and Ecuador are now our Allies in the fight against Japan.

China also honoured the U.S. Constitution commemoration by a stamp issue, the design of which showed the Stars and Stripes and the flag of China waving across a map of China. There were four stamps in the set. Other countries that issued special stamps for this occasion were Honduras, with a design very similar to the Salvador stamp shown here, and

Panama, whose series consisted of eight stamps. The flag of the Dominican Republic has appeared several times on its stamps.

Few of our Allies nearer home have displayed their flags on stamps, but Russia provides two or three illustrations for our collection, notably issues of early 1938 commemorating the successful Polar flights of that time and the 20th anniversary of the founding of the Red Army. In several of these stamps the Hammer and Sickle ensign surmounted by the Soviet star is a prominent feature. Then in June 1938 each of 12 stamps commemorating the new Soviet Constitution showed the Arms of one of the constituent Republics.

The Greek flag is shown on the stamps issued in the Epirus in August 1914.

Denmark is represented by the inclusion of the 10 aur stamp from Iceland, issued in 1939, while Poland issued a U.S. Constitution commemorative in March, 1938, the design of which included the Stars and Stripes, with the Polish flag in the background.

Otherwise we must rely upon displays of National arms for our European Allies. Belgium, Czecho-Slovakia, Holland, and Norway, have all used their national arms on their stamps, in some cases over long periods, so that there is a choice of stamps for our purpose. A typical example is illustrated on the Stamp Gossip page this month, where we show the recent issue from Suriname, the Dutch East Colony, in aid of Prince Bernhard's Bomber Fund.

It is, of course, impossible to illustrate all the stamps available in an article of this length, but a casual glance through the catalogues shows some 50 or 60 items suited to our purpose. We can promise any reader who attempts to make a reasonably complete collection that he will find it an absorbing and worthwhile task. The album pages so formed will be very attractive, for flags as stamp subjects lend themselves well to the effective use of colour. In addition many of the stamps themselves are very striking in design, as our illustrations show.

Stamp Gossip

and Notes on New Issues

Middle East Occupation Issues

At last speculation as to Britain's stamp intentions for the conquered portions of Italy's East African empire is at an end. Stamps of Great Britain, overprinted with the initials "M.E.F." are to be used there. The letters represent "Middle East Force," but the stamps are not intended for military use.

British Forces in the Middle East will continue to use unoverprinted stamps of Britain for their correspondence. Five stamps have been issued, of values 1d., 2d., 2½d., 3d. and 5d.

For the moment, these overprinted stamps will be valid in all parts of the occupied territories, including Abyssinia, as well as Eritrea, Libya and the former Italian Somaliland. Presumably, in due course, Abyssinia will commence to re-issue its stamps of the sovereign State.

New Stamps from Africa and The East Indies

We illustrate this month a specimen of the new Kenya issue, consisting of overprinted South African stamps, to which we referred in last month's Gossip. We show also the 3d. value of the South African "War Effort" series to which reference was made recently. This design is a tribute to the work of South African women, and shows various phases of their war activity.

An additional value in the South African series is a 6d. one, showing an oxy-acetylene welder, in asbestos-protected clothing, at work.

The Suriname 15c. stamp reproduced on this page is one of a series of three stamps issued in aid of Prince Bernhard's Bomber Fund, and is identical in design with the Dutch East Indies issue for the same purpose to which recent reference was made. The inscription reads: "*Netherlands will rise again.*" The arms are those of the House of Orange, the reigning Dutch House, now headed by Queen Wilhelmina.

Swiss Pro Juventute Issue

The annual Pro Juventute issue from Switzerland has just made its appearance, although specimens of the stamps were not available for illustration at the time of going to press. The designs are as follows: 5c., Johann Kaspar Lavater (1741-1801), the Swiss philosopher and journalist; 10c., girl of the Schaffhouse canton, in national costume; 20c., Obwald girl in national dress, and 30c., Daniel Jean Richard (1685-1741), pioneer of the Swiss watch-making industry.

* * * *

A new 1 fr. stamp issued in France has a portrait of Marshal Petain as its central feature.

For the War Collection

Full details of the officia Polish issue, for use on Polish ships sailing from Great Britain and Polish war vessels at sea, are now available and we hope to illustrate the complete series in an early issue. The designs are most attractive and comprise an interesting war series. They include: 10 gr., ruins of the Finance Ministry at Warsaw; 55 gr., the Castle Square seen from a bombed house; 75 gr., a Polish machine gun post; 80 gr., a medium tank; 1 zl., section of British airfield with Polish-manned aircraft on the ground.

* * * *

We illustrate this month the new design introduced for the King's head stamps of India. The simplicity of the design is in striking contrast with previous Indian designs, which have always favoured elaborate framing of the King's head.

Another Indian-printed issue illustrated here is the new Sudan river scene design that has been adopted for all Sudan stamps printed by the Nasik Press to meet the emergency created by the difficulty of securing regular supplies of stamps from Britain. It is understood that the Sudan Administration intend to return to the popular camel design as soon as circumstances permit.

* * * *

New Zealand has re-adopted the 1939 Health stamp design for this year's annual issue. The stamp has been re-issued with simple overprint "1941" placed centrally between the inscription "Postage" and the beach ball that is the prominent feature of the design.

* * * *

A Grenfell Commemorative

The work of the late Sir Wilfred Grenfell in Labrador is commemorated by Newfoundland in a 5c. stamp that was issued on 1st December. The design shows Sir Wilfred on the Bridge of his schooner "*Strathcona*," and an iceberg in the background.

* * * *

Supplies of the Free French colonial postage stamps will be more readily available in future to collectors in Great Britain. Most of these stamps are being printed in London and the Crown Agents for the Colonies are to include them in their distributions to the British stamp trade.

* * * *

This year the 50th anniversary of British protection of the Gilbert and Ellice Islands is to be celebrated by the issue of three stamps.

Fire-Fighting Locomotives on the S.R.

By T. R. Robinson

RAILWAYS are often objectives in air-raids, and the protection of rolling-stock, buildings, and loads in transit against fire is a most important part of railway air-raid defence work. All the four big railway groups have very efficient fire-fighting services for this purpose, but a somewhat novel method of providing mobile and efficient fire-pumps has been adopted by the Southern Railway.

The scheme consists of mounting steam-pumps on a number of tank locomotives, and so enabling them to act as fire appliances—real "fire-engines," in fact! The locomotives selected for the work are Stroudley 0–4–2 tanks, the reason being that they are light enough to run on to sidings and other tracks that could not be traversed by heavier engines, and at the same time have ample power and good steaming qualities.

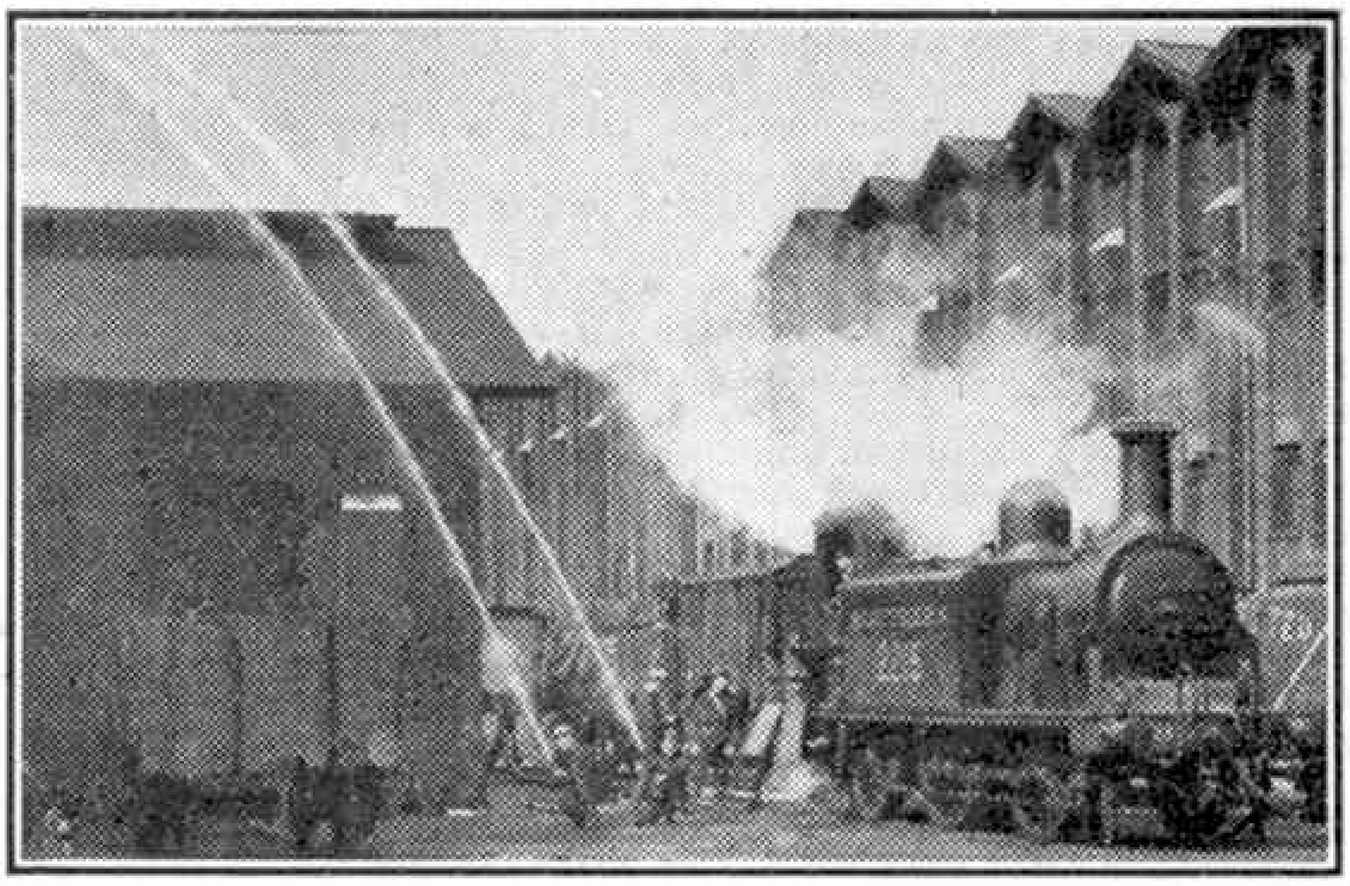
The Merryweather "*Greenwich Gem*" is the fire appliance fitted, and this is a double-cylinder, double-acting pump, capable of delivering about a ton of water per minute at a pressure of between 100 and 120 lb. per sq. in. The position of the pump is above the rear buffer-beam, and as it is a very compact appliance, and fits neatly on the locomotive behind the rear panel of the coal bunker, it does not project in any way that can interfere with normal coupling arrangements. When operating at full capacity the pump permits four jets to be used simultaneously, and a by-pass valve is also provided so that any quantity of water from zero up to maximum output can be delivered to suit the circumstances.

The pump is of gun-metal, with copper air vessels on the suction and delivery branches, and the valves are of the rubber disc type.

Steam is supplied from the locomotive boiler through a special control valve operated from the cab, and the large capacity of the boiler ensures that the pump will not run short of steam however long it may be called upon to operate.

Normally, the supply for the pump is drawn from water mains, tanks or other similar sources, but if these are not available, water from the feed tanks of the locomotive can be used. This supply is naturally limited, and could only be used to subdue a small outbreak. To render the locomotive an even more effective fire-fighting appliance, however, several "tank trains" have been constructed, formed of standard trucks carrying rectangular water tanks that can be coupled together by hoses to provide a supply for the pump. Such a tank train carries sufficient water to extinguish a fairly large fire, and as the locomotive can be used to haul the train to the outbreak and then to pump its contents on the fire, the equipment is singularly efficient.

Three sections of large diameter suction hose, each 20 ft. in length, are carried in a rack at the front of the locomotive, and steel bins, mounted on the sides of the coal bunker, are fitted for the storage of other smaller fire-fighting appliances.



Fire-fighting locomotive demonstration. Photographs by courtesy of the Southern Railway.

The employment of the Stroudley 0–4–2 tanks on this service adds yet another chapter to the history of these useful little locomotives, which already have distinguished themselves by many years of efficient work on suburban and branch working on the Southern Railway. When they were originally built, between 1873 and 1887, air raids were never dreamed of, and their present duties no doubt would have greatly astonished Mr. Stroudley! They are not quite the first engines to be fitted with pumps, for a device of the kind was used at Southampton Docks some 40 years ago, but was discarded on account of its clumsiness, and the time taken to operate it. The idea was considered again in France during the last war, but hostilities ended before it was brought into action.

The Southern Railway scheme has proved most effective, the equipments giving excellent service both in fire-drill and under actual fire outbreak conditions. The locomotives will be located at strategic points on the system, and will be instantly available to cope with fires.

The scheme has been brought forward and designed by Mr. O. V. Bullied, the Chief Mechanical Engineer of the Southern Railway, and has provided a method of fire-fighting peculiarly adapted to railway service.

The illustrations, for which we are indebted to the Southern Railway, give a good idea of the usefulness of the locomotives, and show the powerful jets that can be thrown by the pump.

S.R. locomotive fitted with fire-pumps.

Fireside Fun

LANDSCAPE

The scene was a lovely valley, and an artist was seated at his easel, painting. A small child, seeing the artist, asked her mother what he was going to do.

"He's going to paint the valley," replied his mother.

"Won't he need a lot of paint"!

* * * *

"You seem to be rather unlucky!"

"Unlucky? Why, if I was perishing with hunger in a sandy desert and it came on to rain soup, I should have only a fork to eat it with!"

* * * *

SOME SHOT

The sergeant was shouting at the recruit. "What's the matter with you, man? You score a bull with your first shot, and then miss the target completely with the rest."

"I'm sorry, sergeant. I thought I had to put them all through the same hole!".

* * * *

The guerilla General sent for his engineer and asked: "Jim, how long will it take to throw a bridge across this river?"

"Three days," said the engineer.

"Good," replied the General. "Have the draughtsman make the drawings right away."

After three days the General sent for the engineer again. "How's the bridge?" he asked.

"Bridge is made," replied the engineer, "and you can march across if you don't have to wait for them pictures. They ain't done yet."

* * * *

Master: "Well, and where have you been?"

Boy: "I'm sorry, sir, but I hurt my ankle on the way to school."

Master: "Hmm, another lame excuse."

* * * *

It is the duty of everyone to make at least one person happy during the week," said a Sunday school teacher. "Have you done so Freddy?"

"Yes," said Freddy promptly.

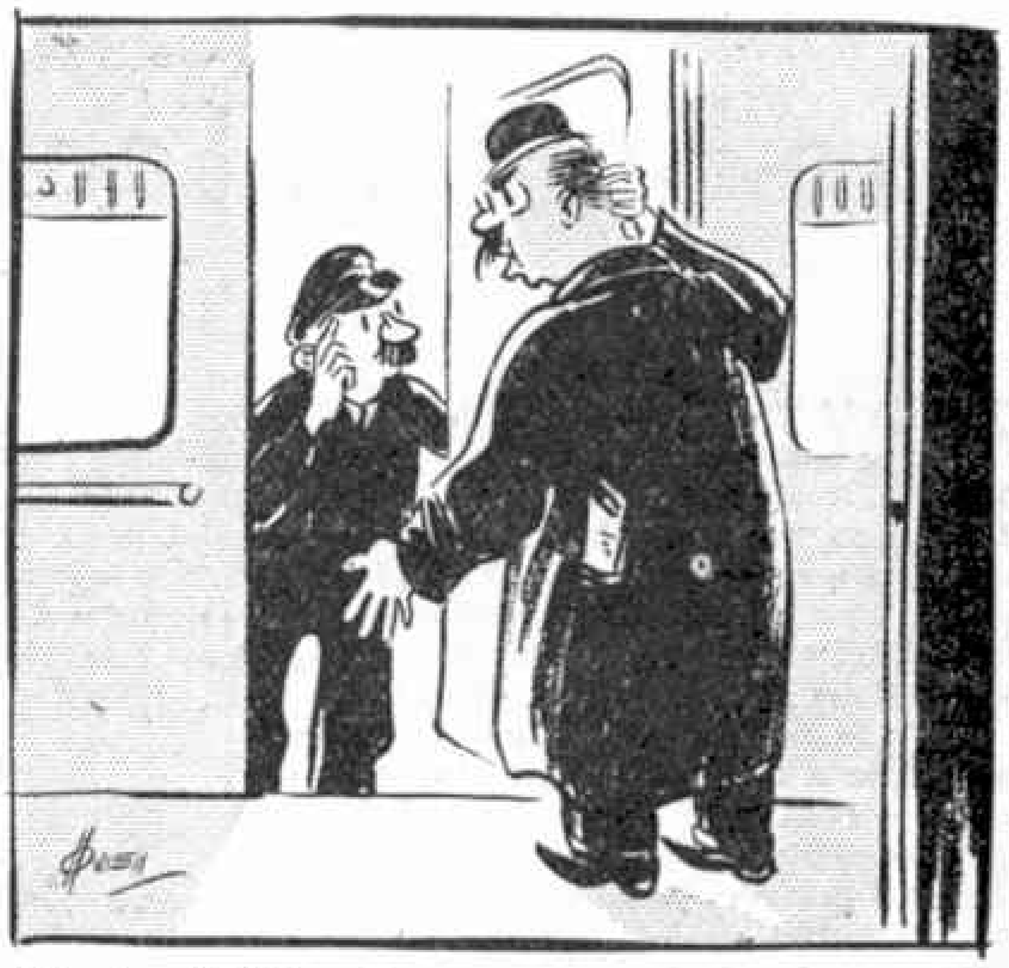
"That's right. What did you do?"

"I went to see my aunt and she was happy when I went home."

* * * *

"Be careful of my floors, my man. They are highly polished."

"Don't worry about me, mum! I won't slip; I've got nails in me boots!"



"Porter, Sir?"

"Look here, porter. I've lost my baggage."

"O.K. Sir! You won't need a porter!"

* * * *

TACTFUL!

The circus proprietor looked very worried as he faced the troupe. "Gentlemen," he began, "times are very bad just now. Last week I could only afford half your wages. This week things are even worse." he stopped for a moment and looked with growing anxiety at the angry faces around him. Then, wiping his damp forehead, he went on: "I've gone into the matter and I find there is enough cash in hand to pay er–er– three of you. The three are: Dave the Dauntless, the lion tamer; Hercules, the strong man; and Strangler Sam, the all-in wrestler."

* * * *

ROOM TO GO WRONG

Spectator: "I can't understand anyone missing a putt as short as that."

Golfer: "Let me remind you that the hole is only four and a quarter inches across—and there is the whole world outside it."

* * * *

A plumber, on joining the Army, went in for a trade test and was asked to make a joint in a lead pipe. When finished, the officer put on his papers: "Joint very nicely done."

Three weeks later the man found himself head cook in the Officers' Mess.

* * * *

The rector had invited the village boys to the rectory for a strawberry tea. After they had finished he said, seeking to point the moral: "Now boys, wasn't that better than breaking into my garden and helping yourselves?"

"Oh, yes," chorused the boys.

"And why was it better?" he asked a chubby-faced boy.

"Because, sir," was the reply, "we shouldn't have had any sugar and cream with them."

* * * *

Mistress: "Where's my husband?"

Maid: "I ain't seen him since we rolled the carpet up, mum."

* * * *

New Tenant: "Your advertisement said that this room had a heavenly outlook."

Landlady: "Well, and ain't it got a skylight?"

* * * *

Mrs. Hookins: "Has the new florist any children?"

Florist's Neighbour: "Yes, a little girl who is a budding genius and a little boy who is a blooming nuisance."

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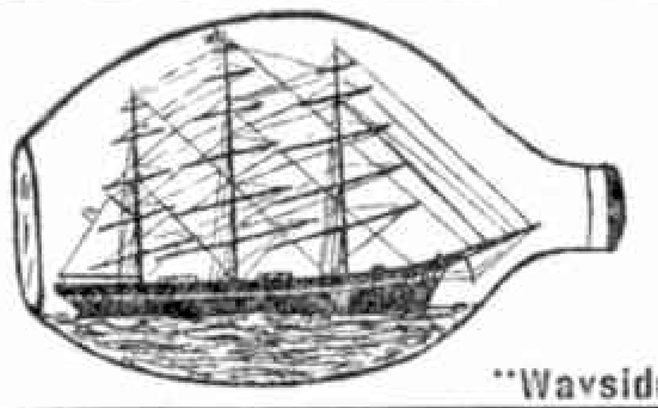

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Wanted. A large layout of Hornby-Dublo or Trix Twin, to form model railway; also a quantity of farm Animals and Soldiers, etc.; all must be in perfect condition.—"Trix," 17, Wyld Way, Wembley, Middlesex.

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Wanted. A complete layout of Hornby gauge "0" Clockwork or Electric; must be in excellent condition and reasonable.—F. Riddle, 239, Broadway, Southall, Middlesex.

Sale. £13 of Hornby Electric Railways or exchange for gauge "00". Details—S. Fox, Hope Inn, Truro, Cornwall.

Wanted. One EODPR. Dublo Electrically-operated Point.—Tasker, 39, Northgate, Barnsley.

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Sale. "Meccano Magazines," February 1935 to December 1941, inclusive. Offers to—Challis, 18, Duchy Drive, Heaton, Bradford, Yorks.

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READERS' SALES AND WANTS

(*Continued from page xi*)

Wanted. Steam Pressure Gauge, 1 in. diam., 0-100 lbs.; also H.T. Battery Superseder; also A.C. Mains Transformer, 230 v. 50 cycle, 12 volt.—N. King, Brickwall House, North Weald, Essex.

Wanted. Collection of Stamps; particulars and price to—Price, 36, Tyrfran Avenue, Llanelly, South Wales.

Sale. Good collection of Hornby Railway equipment, gauge "0," including two Transformers and two Locos. in good condition. Pre-war value £13/10/– Postage extra. Offers to—R. Pickerill, 39, Windsor Road, Stirchley, Birmingham 30.

Wanted. "M.M." for January 1940.—Cooper, Queen's Hotel, Stonehaven, Scotland.

Wanted. .22 Sporting Rifle in good working condition. State price. Write—St. Aubyns, 20, Chanctonbury Road, Hove 4, Sussex.

Models. A good working Hot Air Engine, suitable for boy in early 'teens. Offers and particulars to Edwards, 30, Mayfield Avenue, Newcastle, Staffs.

Sale. Gauge "0" Control System, Rolling Stock, etc.; also "Simplex" Typewriter. Offers—24, Gladstone Street, Great Moor, Stockport.

Sale. At least £8 of Hornby gauge "0" Trains; new conditions; state offers. For particulars—Greenaway, 9, Collier Street, Johnstone, Renfrewshire.

Wanted. M3 Clockwork Tank, "0"; No. 2 Corridor Coaches, S.R.; Station Staff, etc., "0."—K. Coyne, 217, Bowbridge Road, Newark, Notts.

Sale. Fifty "Meccano Magazines" between March 1936 and October 1941; also pair Roller Skates, perfect.—King, 42, Kingsmead Avenue, Worcester Park, Surrey.

For Sale. Complete Hornby Railway, gauge "0" Clockwork. Wanted. Hobbies Lathe and Fretsaw; also Circular Saw attachment and other Accessories; must be in good condition; "The Practical Woodworker" (complete); also a small Mains Electric Motor suitable for driving "Hobbies Lathe," voltage 220–250; both, good condition.—Soutar, Nettles Corner, St. Austell, Cornwall.

Sale. Complete or in parts, "Meccano Magazines," Jan. 1926 to Dec. 1941; large quantity Red/Green Meccano including Clockwork Motor; also Adana size 2 Printing Machine with Type. Offers?—Allen, 4, Spring Terrace, Abingdon, Berks.

Wanted. Six 3 in. Wheels and Tyres, good condition.—Newman, 3, Haughton Villas, Welsh Walls, Oswestry, Salop.

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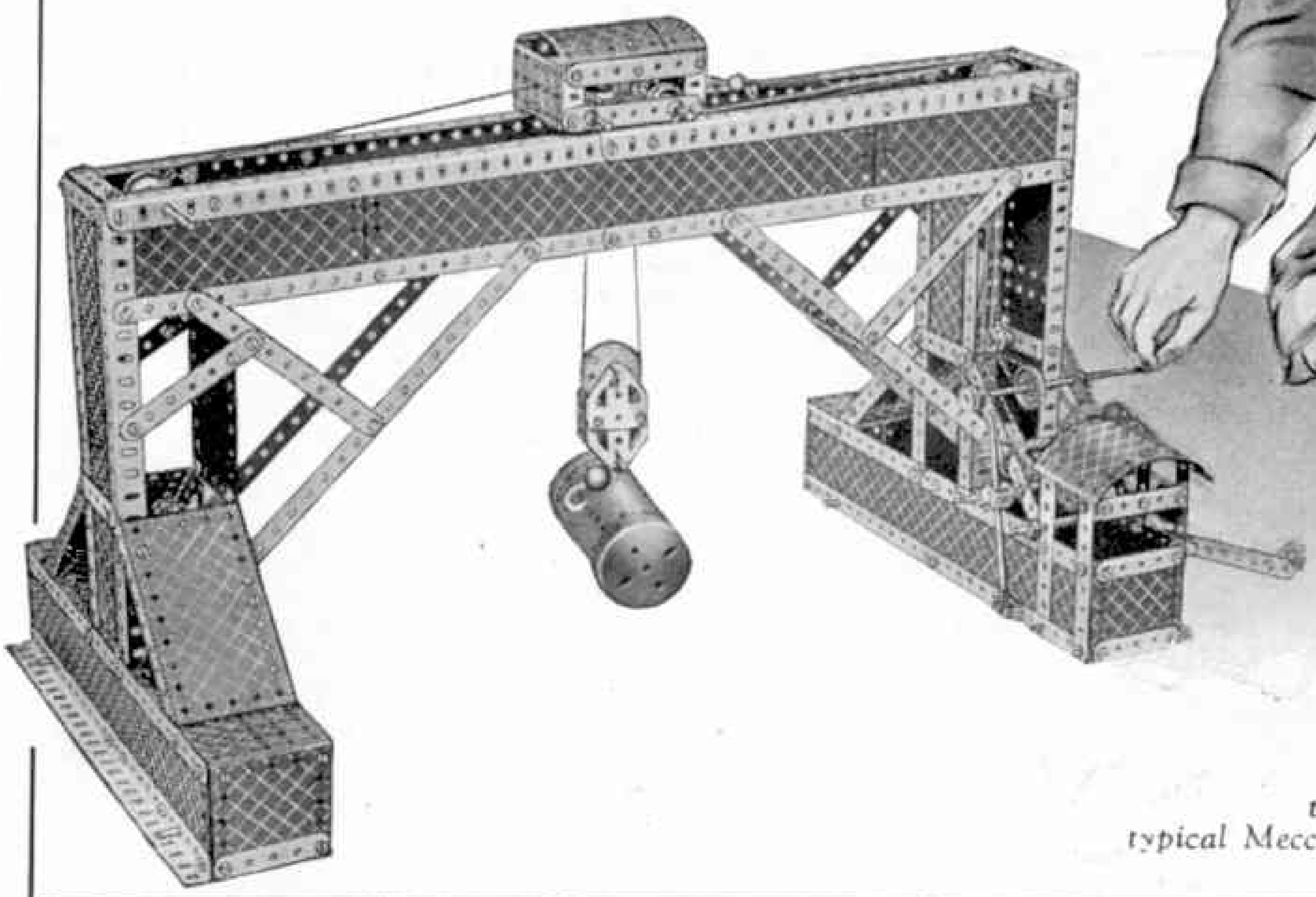

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